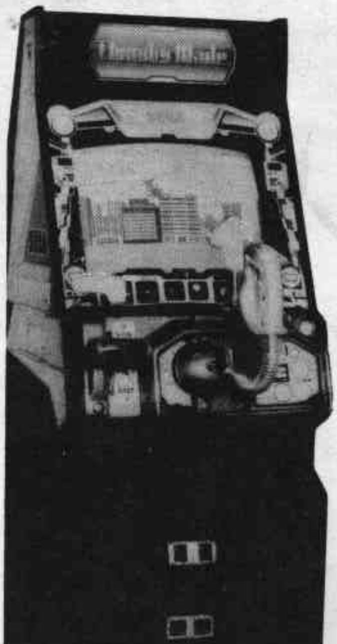
1ST-PRINTING-MR

SEGA®

Thunder Blade

ECONOMY UPRIGHT TYPE Ⅱ

OWNER'S MANUAL



SEGA ENTERPRISES,LTD.

MANUAL NO. 420-5876-01

TABLE OF CONTENTS

SPECIFICATIONS

INSTALLATION SPACE	: 700 mm (27.6in.) W × 550 mm (21.6in.) D
HEIGHT	: 1650 mm (65. 0in.)
POWER	: 180 W
C. R. T.	: 20″ MONITOR
WEIGHT	: 110 kg. (242.5 lbs.)

NOTE

○ Descriptions herein contained may be subject to improvement changes without notice.

INTRODUCTION OF THE OWNER'S MANUAL

SEGA ENTERPRISES, LTD., supported by its high electronic technology of LSIs, microprocessors, etc. and a wealth of experience, has for more than 30 years been supplying various innovative and popular game machines to the world market. This OWNER'S manual is intended to provide detailed comments together with all the necessary information covering the operation in general of electronic assemblies, electromechanicals servicing control, spare parts, etc. as regards the THUNDER BLADE ECONOMY UPRIGHT Ⅱ a new SEGA product. The manual is intended for those who have knowledge of electricity and technical expertise especially in ICs, CRTs, microprocessors, etc. Carefully read so as to acquire sufficient knowledge before working on the machine. Should there be a malfunction, nontechnical personnel should under no circumstance touch the interior system.

1. HANDLING PRECAUTIONS

When installing or inspecting, be very careful of the following points and pay attention to ensure that the player can enjoy the game safely.

- o Be sure to turn the power off before working on the machine.
- o To insert or pull out the plug quickly is dangerous.
- o It is necessary to make sure that the power cord or the grounding wire is not exposed on the road, etc. in a manner so as to be dangerous. Make sure that grounding connections are made safely at the position where so specified.
- o Do not use any fuse that does not meet the specified rating.
- o Make complete connections for the IC board and other connecters. Insufficient insertion is very dangerous.

Also, for the IC board circuit inspections, only the logic tone is allowed. The use of a tester is not permitted, so be careful in this regard. After confirming that there are no irregularities, turn the power ON.

2. PREVENTION OF COUNTERFEITING AND CONVERSION

LABELLING

To prevent counterfeits and conversions, the following labels are put on all the SEGA products. When handling such goods, be sure to confirm the labels. They are used to prevent illegal acts such as the unauthorized copying of the products and the printed circuit boards thereof or carrying on business by manufacturing similar merchandise or by converting, selling or using such products or printed circuit boards.

ORIGINAL SEAL

The following seal is put on the machines manufactured by SEGA.

LICENSE SEAL

The following seal is put on the kits, such as the printed circuit boards, of SEGA products.





COPYRIGHT NOTICE

This SEGA product has the copyright notice as follows:

© SEGA 1987

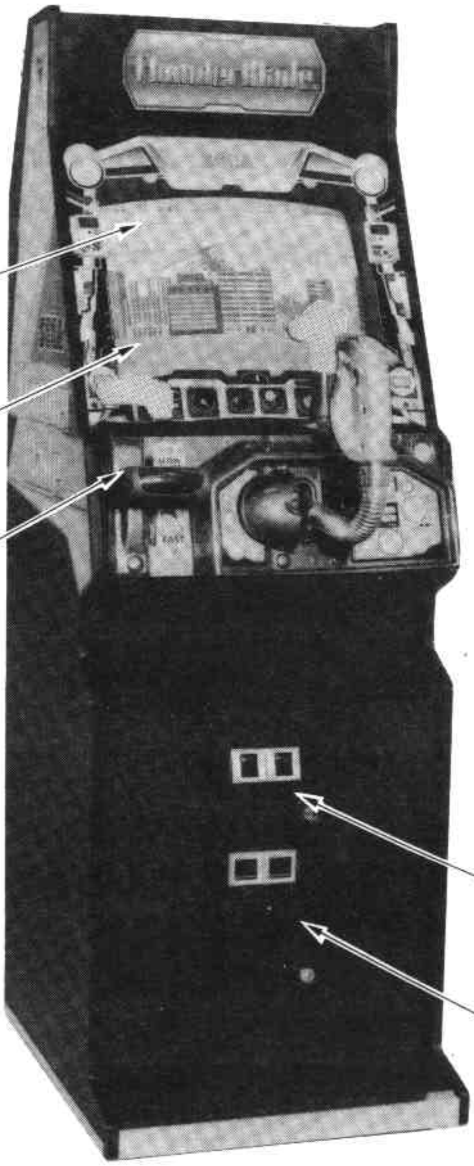
This signifies that this work was disclosed in 1987 and is the property of SEGA ENTERPRISES, LTD.

3. PRECAUTIONS CONCERNING THE PLACE OF INSTALLATION

The THUNDER BLADE ECONOMY UPRIGHT II is an indoor game machine. Absolutely do not install it outside. Even indoors, avoid installing in places mentioned below so as to ensure proper usage:

- o Places subject to rain or water leakage, or condensation due to humidity.
- o In the proximity of an indoor swimming pool and/or shower.
- o Places subject to direct sunlight.
- o Places subject to heat sources from heating units, etc., or hot air.
- o Vicinity of highly inflammable/volatile chemicals or hazardous matter.
- o Sloped surfaces.
- o Vicinity of antidisaster facilities such us fire exits and fire extinguishers.
- o Places subject to any type of violent impact.
- o Dusty places.

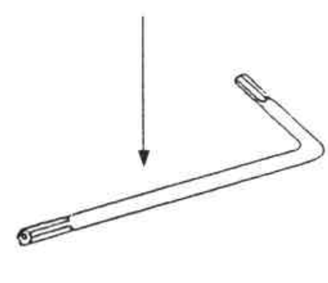
4. NAME OF PARTS ①



TOOLS

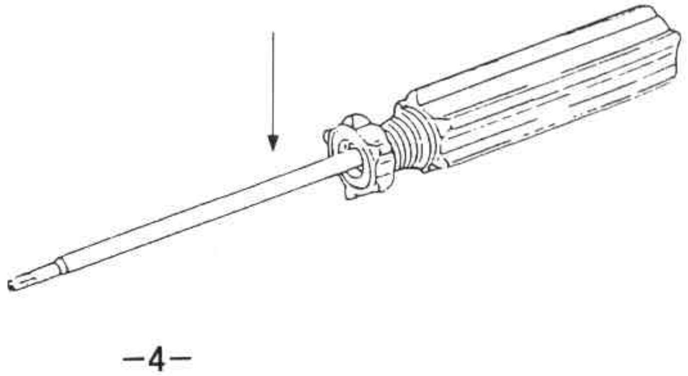
(TAMPERPROOF WRENCH)

M4 540-0006-01
M5 540-0007-01
M6 540-0015-01

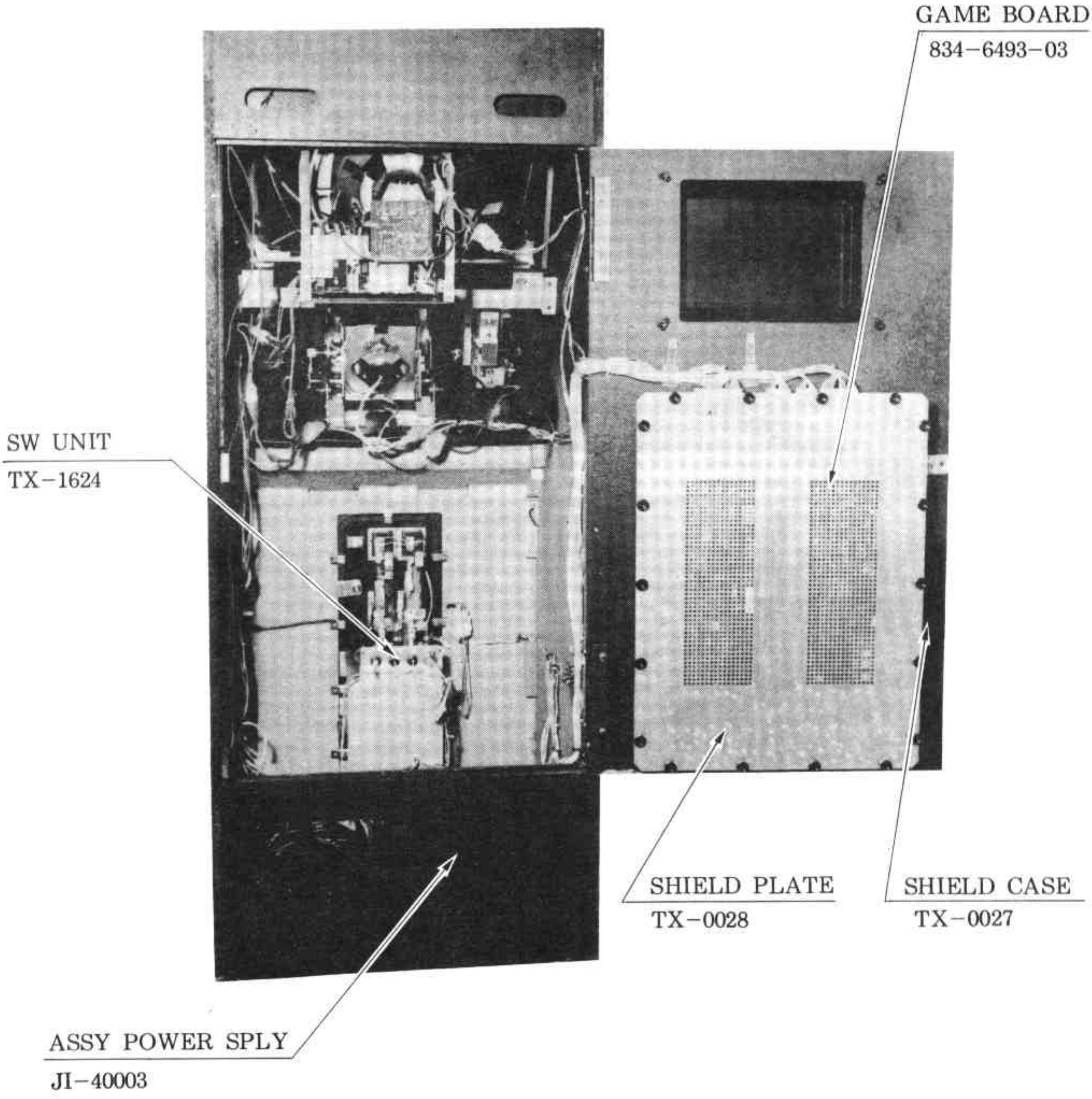


(TAMPERPROOF WRENCH)

M4 540-0018
M5 540-0017

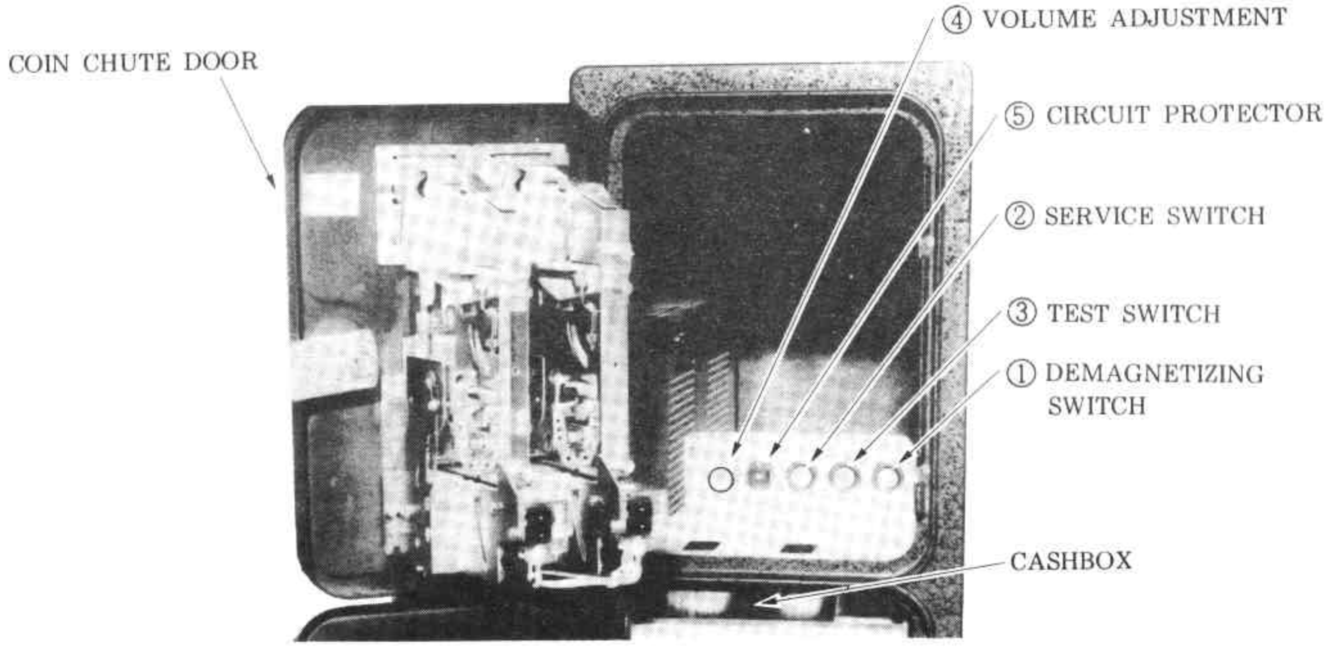


NAME OF PARTS ②



5. SERVICE SWITCH FUNCTIONS

The layout as shown below can be viewed by opening the coin chute door.



INSTRUCTIONS

① DEMAGNETIZING SWITCH .... Used for removing the on-screen color uneveness.

② SERVICE SWITCH .... Used for the purpose of servicing and increasing the credits without registering on the meter (this allows you to check the game).

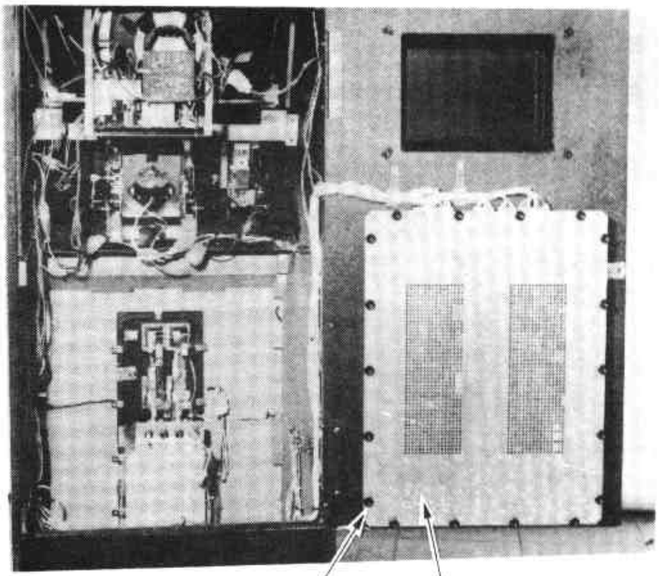
③ TEST SWITCH .... For operating this switch, see SELF-TESTING.

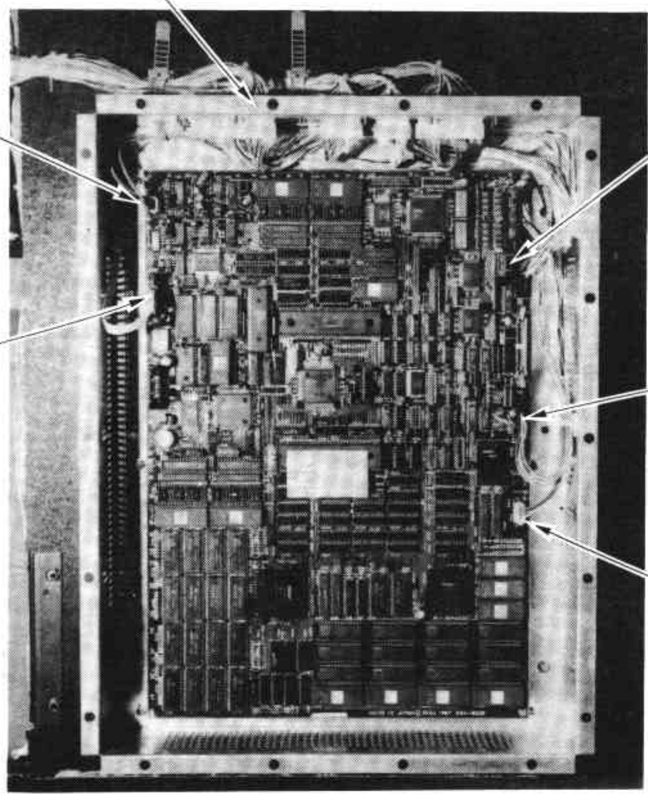
④ VOLUME ADJUSTMENT .... The volume of the speaker inside the cowl can be adjusted.

⑤ CIRCUIT PROTECTOR .... When the motor is overloaded, the breaker functions, causing the motor which is connected with the handle, to stop. To restart it, push the projecting portion of the CIRCUIT PROTECTOR.

6. IC BOARD

Open the back door of the cabinet, pull on the 18 NYLACHes and take off the shield plate to perform game board maintenance.

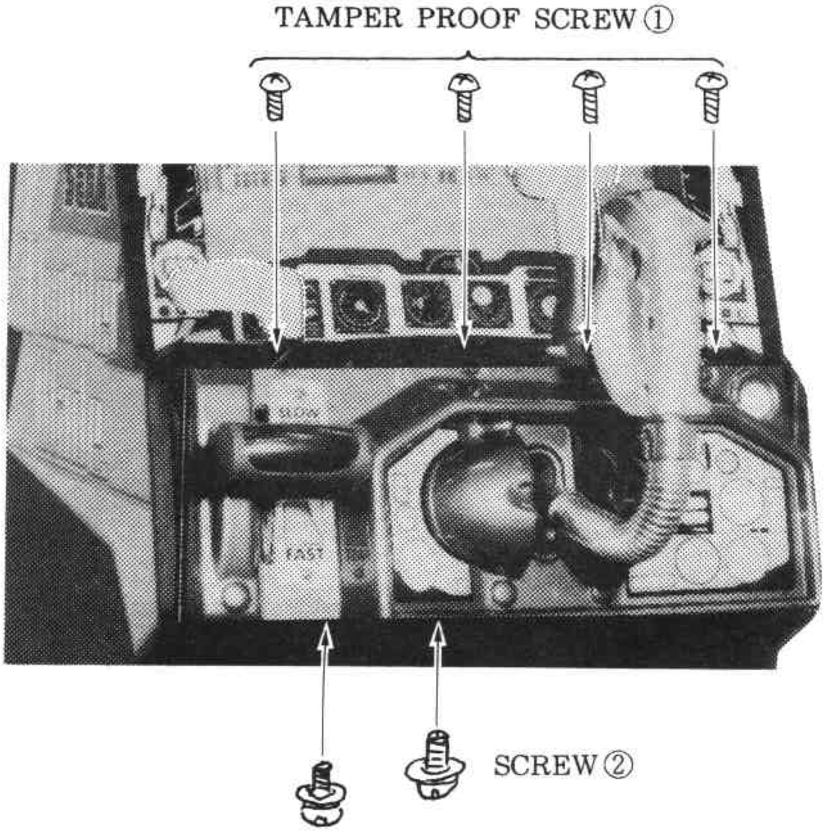




7. OPENING THE CONTROL UNIT AND ADJUSTMENT

1. OPENING THE CONTROL UNIT

o When opening the CONTROL UNIT, take off the 4 TAMPERPROOF SCREWS ①, open the COIN CHUTE DOOR, take off the 2 SCREWS ②, and the entire CONTROL UNIT will open towards you.



2. HANDLE & THROTTLE UNIT ADJUSTMENT

In the test mode, cause the DIAGNOSTIC INPUT DISPLAY to appear on the screen (to select it, push the test switch and move the handle upward and downward).

DIAGNOSTIC
INPUT TEST

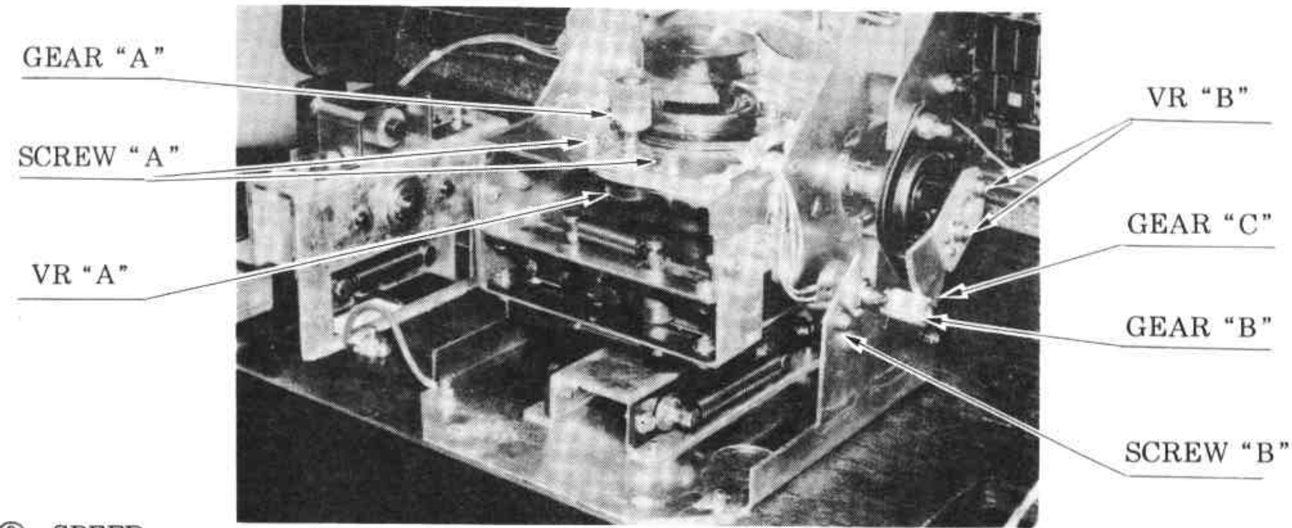
COIN #1 OFF START OFF
COIN #2 OFF SERVICE OFF

VALCAN OFF
MISSILE OFF

STICK RIGHT LEFT 80H ①
STICK UP DOWN 80H ②
SPEED 80H ③

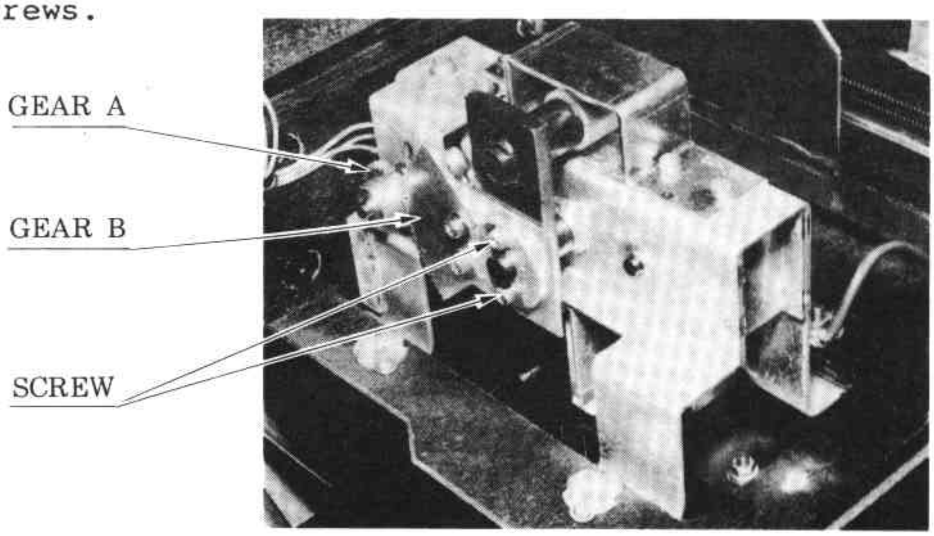
① To make VR adjustments in a horizontal direction (RIGHT/LEFT), release the VR "A" bracket's "A" screws and turn gear "A" in a manner so that when the handle grip is in an unoperated status, 80H±2H is obtained. At this time, also make backlash adjustments.

② When making vertical (UP/DOWN) adjustments, while maintaining the present inclination of the handle unit, unfasten the gear "C" bracket's "B" screws and fasten the gear "C" bracket when the monitor display shows 80H±2H. For backlash adjustments, loosen the VR "B" bracket.

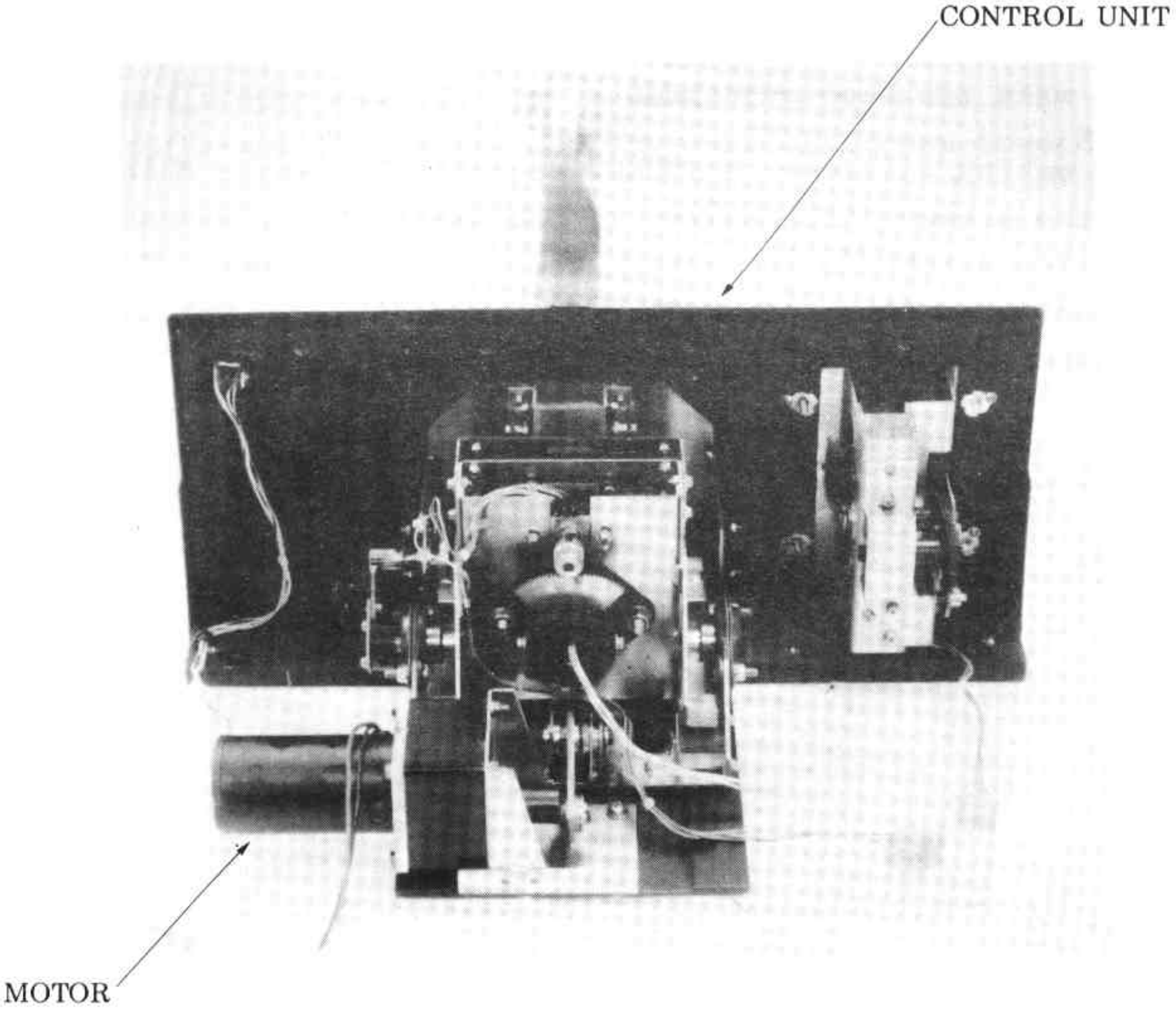


③ SPEED

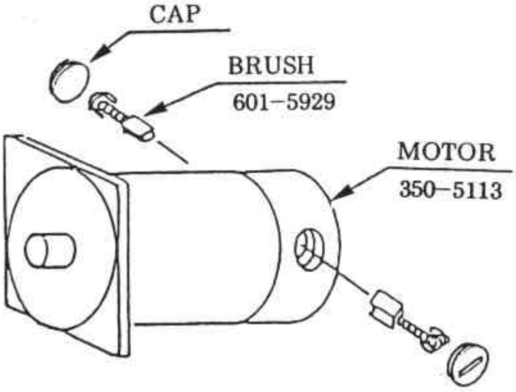
Unfasten the 2 adjustment screws to loosen the volume bracket, making sure that in relation to the gear engagement, the variable value in the test mode is within the allowable adjustment range, and then refasten the adjustment screws.



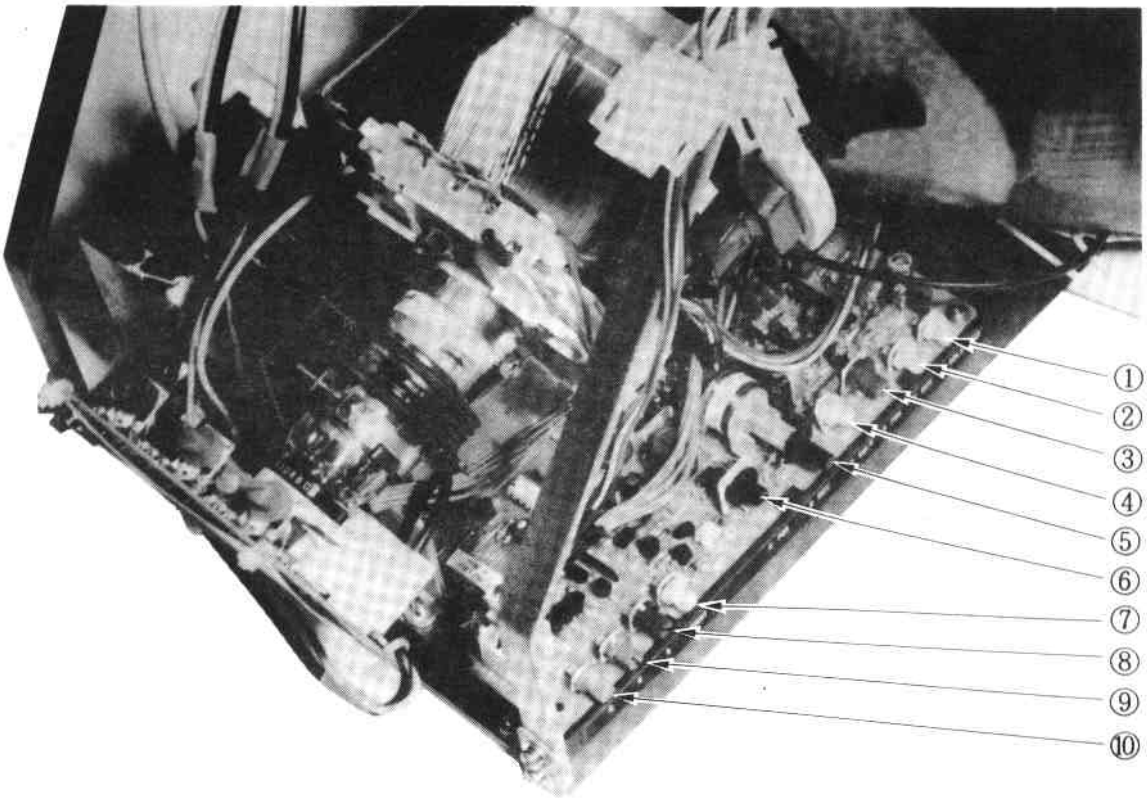
8. REPLACING THE MOTOR BRUSHES



To replace the motor brushes, release the cap with a screwdriver, etc. and take out the brushes. Replacement once every 6 months is recommended. Make sure that both brushes are simultaneously replaced.



9. 20 INCH MONITOR



① V. HOLD

② V. SIZE

③ V. POSITION

④ H. HOLD

⑤ H. SIZE

⑥ H. POSITION

⑦ BRIGHT

⑧ B. GAIN

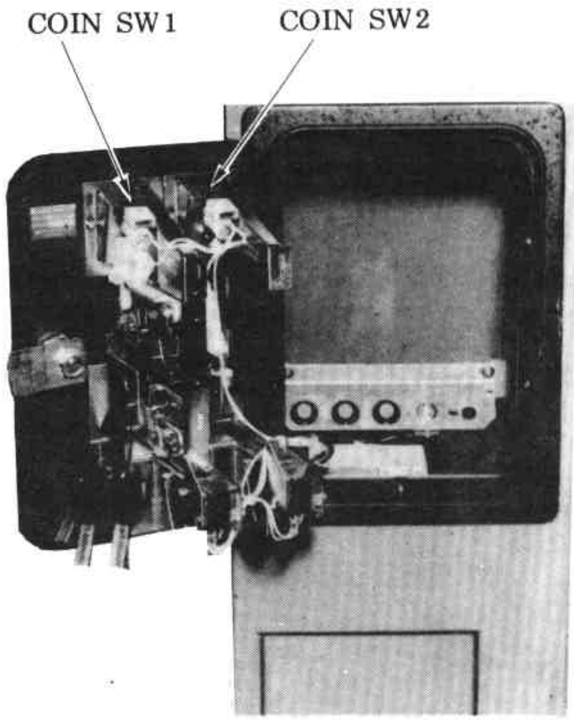
⑨ G. GAIN

⑩ R. GAIN

10. DIP SWITCH SETTING

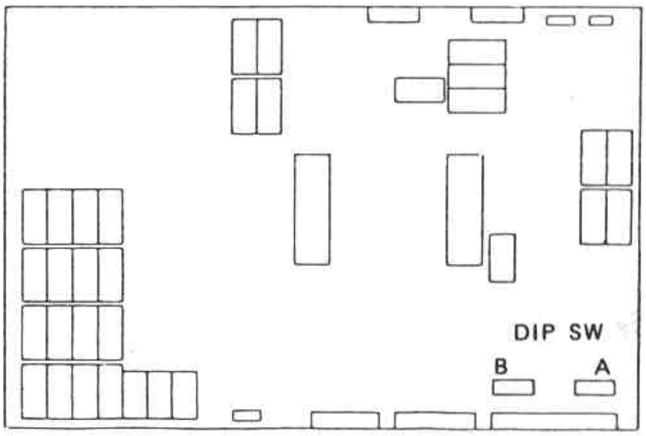
COIN/CREDIT OPTION SWITCH SETTING — DIP SWA

OPTION		1	2	3	4	5	6	7	8
1 COIN	1 CREDIT	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1 COIN	2 CREDITS	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
1 COIN	3 CREDITS	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
1 COIN	4 CREDITS	ON	ON	OFF	OFF	ON	ON	OFF	OFF
1 COIN	5 CREDITS	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF
1 COIN	6 CREDITS	ON	OFF	ON	OFF	ON	OFF	ON	OFF
2 COINS	1 CREDIT	OFF	ON	ON	OFF	OFF	ON	ON	OFF
3 COINS	1 CREDIT	ON	ON	ON	OFF	ON	ON	ON	OFF
4 COINS	1 CREDIT	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON
2 COINS	3 CREDITS	ON	OFF	OFF	ON	ON	OFF	OFF	ON
2 COINS 4 COINS 5 COINS 6 COINS	1 CREDIT 2 CREDITS 3 CREDITS 4 CREDITS	OFF	ON	OFF	ON	OFF	ON	OFF	ON
2 COINS 4 COINS	1 CREDIT 3 CREDITS	ON	ON	OFF	ON	ON	ON	OFF	ON
1 COIN 2 COINS 3 COINS 4 COINS 5 COINS	1 CREDIT 2 CREDITS 3 CREDITS 4 CREDITS 6 CREDITS	OFF	OFF	ON	ON	OFF	OFF	ON	ON
1 COIN 2 COINS 3 COINS 4 COINS	1 CREDIT 2 CREDITS 2 CREDITS 5 CREDITS	ON	OFF	ON	ON	ON	OFF	ON	ON
1 COIN 2 COINS	1 CREDIT 3 CREDITS	OFF	ON	ON	ON	OFF	ON	ON	ON
FREE PLAY		ON	ON	ON	ON	ON	ON	ON	ON
		COIN SW # 1				COIN SW # 2			



GAME OPTION SWITCH SETTING — DIP SW B

OPTION		1	2	3	4	5	6	7	8
※ CABINET TYPE	ECONOMY U/R Ⅱ	ON							
ADVERTISE SOUND	OFF		OFF						
	ON		ON						
TIME 30 SEC				OFF					
TIME 0 SEC				ON					
NUMBER OF SHIPS	3				OFF	OFF			
	2				OFF	ON			
	4				ON	OFF			
	5				ON	ON			
CONTINUE							OFF		
NOT CONTINUE							ON		
GAME DIFFICULTY	NORMAL							OFF	OFF
	EASY							OFF	ON
	HARD							ON	OFF
	HARDEST							ON	ON

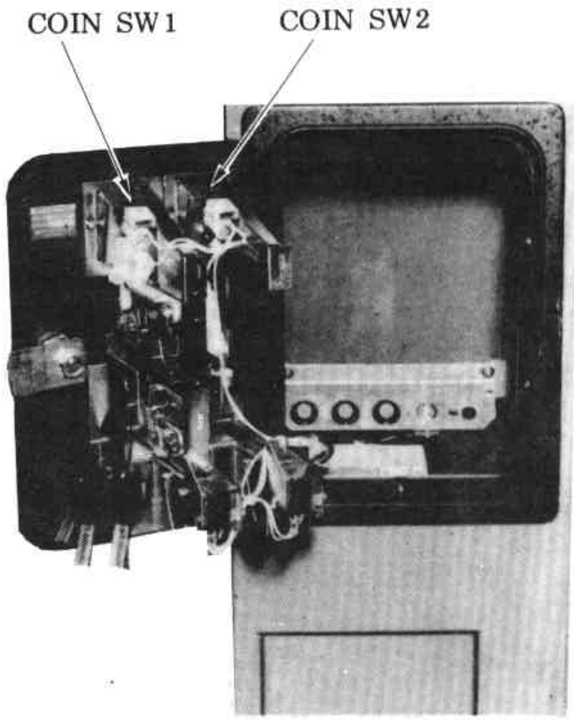


∗The above TIME 30 SEC signifies that the allotted number of player's helicopters does not decrease regardless of how many are lost within said 30 second period.

10. DIP SWITCH SETTING

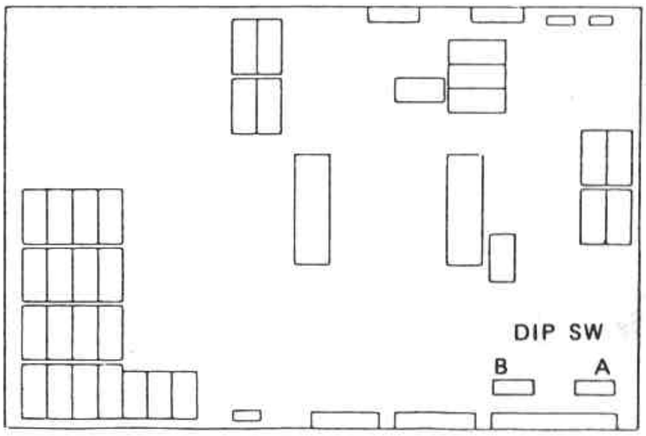
COIN/CREDIT OPTION SWITCH SETTING — DIP SWA

OPTION		1	2	3	4	5	6	7	8
1 COIN	1 CREDIT	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1 COIN	2 CREDITS	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
1 COIN	3 CREDITS	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
1 COIN	4 CREDITS	ON	ON	OFF	OFF	ON	ON	OFF	OFF
1 COIN	5 CREDITS	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF
1 COIN	6 CREDITS	ON	OFF	ON	OFF	ON	OFF	ON	OFF
2 COINS	1 CREDIT	OFF	ON	ON	OFF	OFF	ON	ON	OFF
3 COINS	1 CREDIT	ON	ON	ON	OFF	ON	ON	ON	OFF
4 COINS	1 CREDIT	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON
2 COINS	3 CREDITS	ON	OFF	OFF	ON	ON	OFF	OFF	ON
2 COINS 4 COINS 5 COINS 6 COINS	1 CREDIT 2 CREDITS 3 CREDITS 4 CREDITS	OFF	ON	OFF	ON	OFF	ON	OFF	ON
2 COINS 4 COINS	1 CREDIT 3 CREDITS	ON	ON	OFF	ON	ON	ON	OFF	ON
1 COIN 2 COINS 3 COINS 4 COINS 5 COINS	1 CREDIT 2 CREDITS 3 CREDITS 4 CREDITS 6 CREDITS	OFF	OFF	ON	ON	OFF	OFF	ON	ON
1 COIN 2 COINS 3 COINS 4 COINS	1 CREDIT 2 CREDITS 3 CREDITS 5 CREDITS	ON	OFF	ON	ON	ON	OFF	ON	ON
1 COIN 2 COINS	1 CREDIT 3 CREDITS	OFF	ON	ON	ON	OFF	ON	ON	ON
FREE PLAY		ON	ON	ON	ON	ON	ON	ON	ON
		COIN SW # 1				COIN SW # 2			



GAME OPTION SWITCH SETTING — DIP SW B

OPTION		1	2	3	4	5	6	7	8
※ CABINET TYPE	ECONOMY U/R Ⅱ	ON							
ADVERTISE SOUND	OFF		OFF						
	ON		ON						
TIME 30 SEC				OFF					
TIME 0 SEC				ON					
NUMBER OF SHIPS	3				OFF	OFF			
	2				OFF	ON			
	4				ON	OFF			
	5				ON	ON			
CONTINUE							OFF		
NOT CONTINUE							ON		
GAME DIFFICULTY	NORMAL							OFF	OFF
	EASY							OFF	ON
	HARD							ON	OFF
	HARDEST							ON	ON



*The above TIME 30 SEC signifies that the allotted number of player's helicopters does not decrease regardless of how many are lost within said 30 second period.

12. SELF-TEST

This test mainly checks the operation of game PCB's, discovers defects if any, and also checks monitor colors and audio quality. In addition, the test indicates DIPSW assignment and has a Bookkeeping function.

TEST PROGRAM

(1) Memory Test : Checks the EPROM programs and RAM Area.
(2) Input Test : Tests the operation of COIN, CANNON, MISSILE, SERVICE switches, etc.
(3) Output Test : Tests the operation of each lamp. (NOT USE DELUXE TYPE)
(4) Sound Test : Checks the quality of the synthesized sound transmitted from the PCB.
(5) CRT Test : Checks colors displayed.
(6) Dip Switch Assignment : Indicates dip switch assignments.
(7) Bookkeeping : Indicates data on average score and play time.
(8) Backup RAM Clear : Clears Bookkeeping memory.

1. TEST OPERATION

(1) Push the TEST SW button to display the test menu (Fig. 1).

```
DIAGNOSTIC
  ⇨  INDIVIDUAL

       MEMORY   TEST
       INPUT    TEST
       OUTPUT   TEST
       SOUND    TEST
       C.R.T.   TEST
       DIP SWITCH ASSIGNMENTS
       BOOKKEEPING
       BACKUP RAM CLEAR
       EXIT

SELECT BY LEVER PUSH TEST BUTTON !
```

FIG. 1

(2) Move the lever upward or downward and bring the arrow to the desired position. Press the TEST SW button again to display the desired test.

(3) When each test is finished, press the TEST SW button again to display the test menu (Fig. 1).
To end the test program, bring the arrow to EXIT and push the TEST SW button.

* INDIVIDUAL and CONTINUE can be selected by pushing the START button when the arrow is at the top position.

INDIVIDUAL : Indicates only the item which the arrow points to. Push the TEST SW button again to display the test menu (Fig. 1).

CONTINUE : After displaying the item which the arrow points to, push the TEST SW button again to proceed to the following test in the order as indicated in the Fig. 1 test menu.

2. TEST ITEMS AND DESCRIPTION

(1) Memory Test

DIAGNOSTIC

MEMORY TEST

** ROMS TEST **

IC.	20	GOOD	IC.	29	GOOD	IC.	57	GOOD
IC.	21	GOOD	IC.	30	GOOD	IC.	58	GOOD
IC.	62	GOOD						
IC.	63	GOOD						

** RAMS TEST **

IC.	22	GOOD	IC.	31	GOOD	IC.	38	GOOD
IC.	23	GOOD	IC.	32	GOOD	IC.	39	GOOD
IC.	55	GOOD	IC.	60	GOOD	IC.	125	GOOD
IC	56	GOOD	IC.	61	GOOD	IC.	126	GOOD
IC.	132	GOOD	IC.	134	GOOD	IC.	150	GOOD
IC.	133	GOOD	IC.	135	GOOD	IC.	151	GOOD

CUSTOM IC TEST

IC.	37	GOOD	IC.	41	GOOD	IC.	53	GOOD
IC.	107	GOOD	IC.	108	GOOD			

Checks the game PCB's 8 main ROMs, 18 RAMs and 5 CUSTOM IC's.

GOOD means the IC is in "GOOD" operating condition.

If there exists any malfunctioning of the IC's, "BAD" will be indicated.

(2) INPUT TEST

DIAGNOSTIC

INPUT TEST

COIN CHUTE 1
COIN CHUTE 2
☆ START SW
SERVICE SW
MISSILE
CANNON
LEVER UP DOWN 80H
LEVER LEFT RIGHT 80H
SLOTTLE 80H

① Operate each switch. When the "OFF" condition is changed to "ON", the corresponding switch is in good working order.

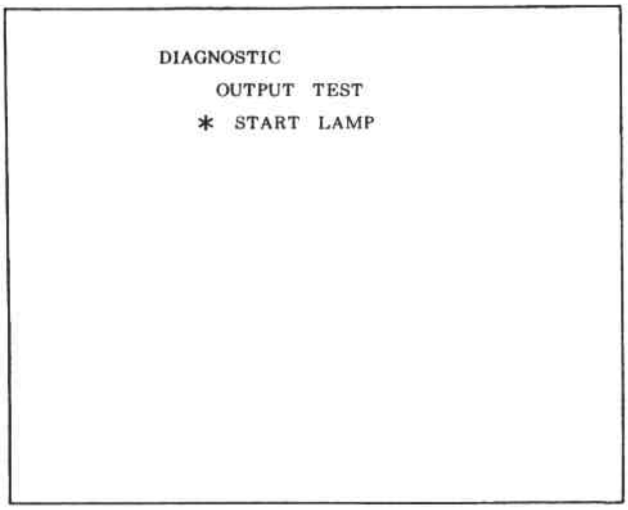
② Date values should increase when the handle grip is moved upward, decrease when vhen it is moved downward, and indicate 80 (±2) H when released.

③ Date values should increase when the handle grip is moved to the right, decrease when it is moved to the left, and indicate 80 (±2) H when released.

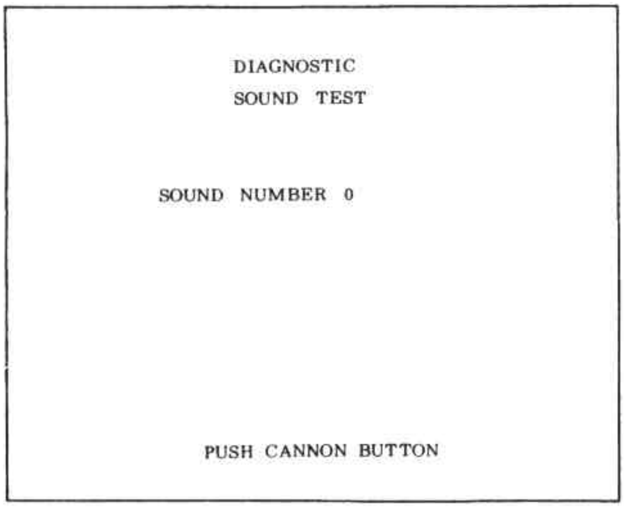
④ Date value should increase when the throttle lever is moved backward, decrease when it is moved forward, and indicate 80 (±2) H when released.

(3) OUTPUT TEST

Each lamp will flash if it is working properly.

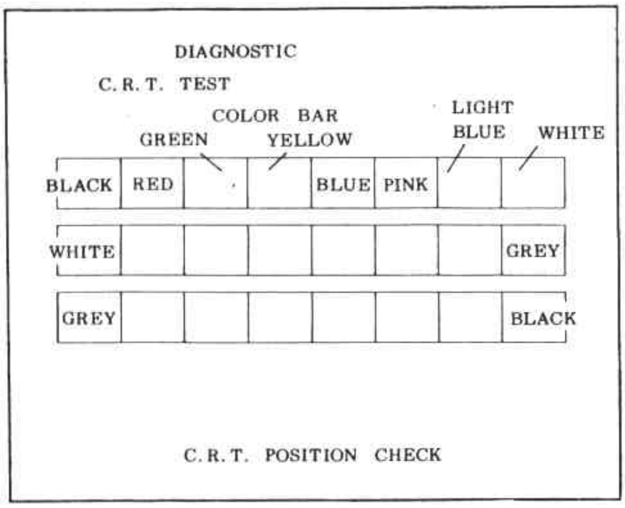


(4) SOUND TEST



When the test has been completed, push CANNON button.

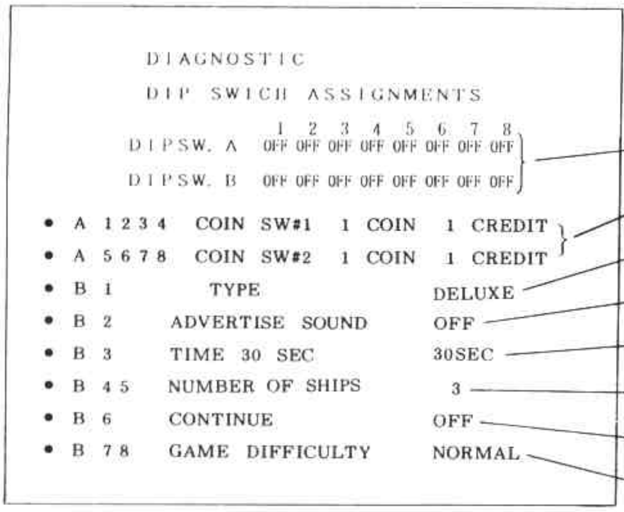
(5) C. R. T. TEST



① Checks the C.R.T. position. Make sure that the on-screen corners are consistent, and then make size adjustments.

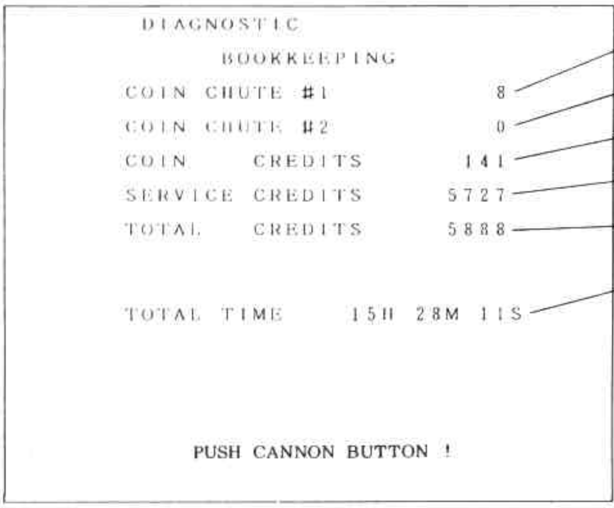
② Color check.

(6) DIP SWITCH ASSIGNMENTS



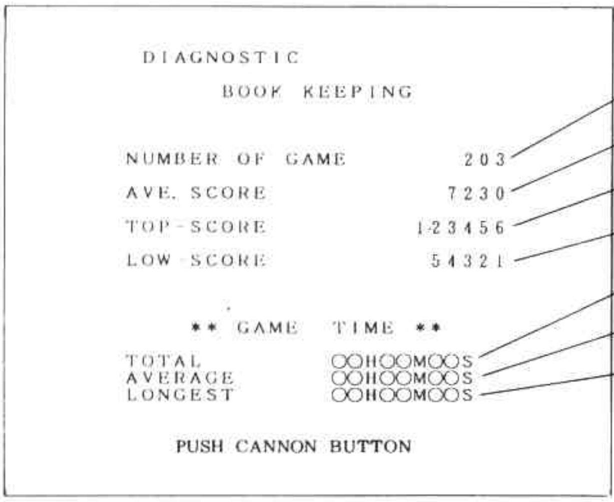
① Present setting of each dip switch
② Coin switch setting
③ Cabinet type
④ Advertise sound
⑤ Time 30 sec
⑥ Awarding player's additional helicopter(s)
⑦ To continue game or not
⑧ Game difficulty

(7) Bookkeeping



① Operation frequency of coin chute 1
② Operation frequency of coin chute 2
③ Number of coin credits
④ Usage frequency of service switch
⑤ Number of credits in total
⑥ Total working time (〇〇 H 〇〇 M 〇〇 S)

Press the CANNON button to display the following :



① Total number of game plays
② All players' average score
③ Highest score
④ Lowest score
⑤ Total game play time
⑥ Average game play time
⑦ Longest game play time

Note : When any data exceeds the capacity, "OVERFLOW" will be shown on the screen. At this time, perform BACKUP RAM CLEAR.

(8) BACKUP RAM CLEAR

Bookkeeping data is stored for at least 3 days after the power is turned off. When clearing, bring the arrow to YES and push the TEST button.

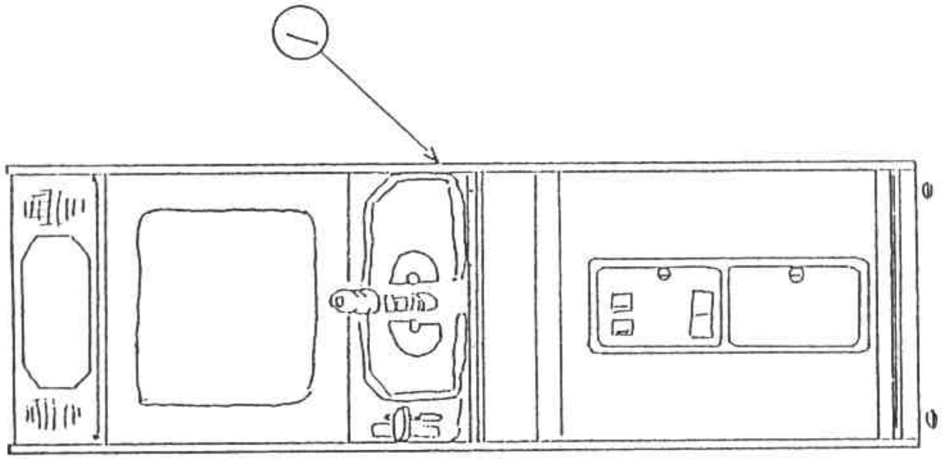
```
DIAGNOSTIC
   BACKUP RAM CLEAR
          NO
      ⇨  YES

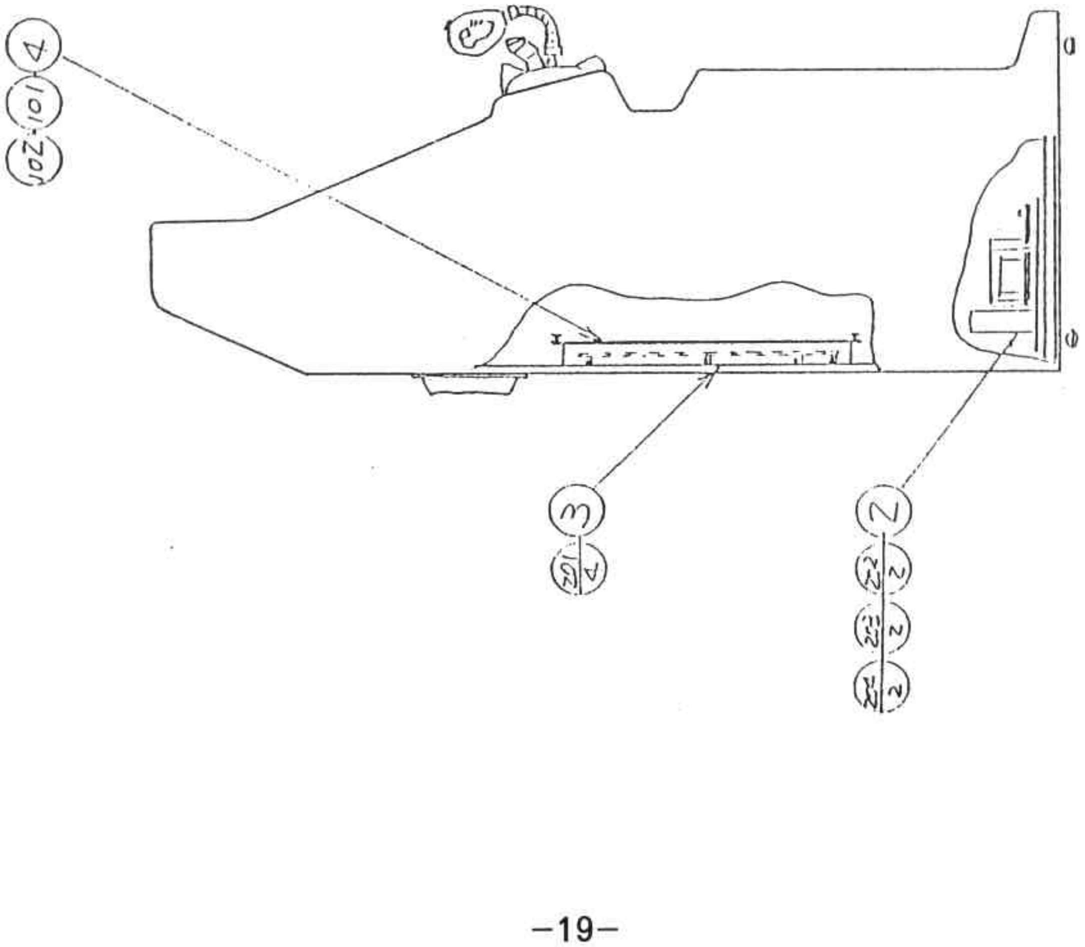


    SELECT BY LEVER
 PUSH TEST BUTTON !
```

13. PARTS LIST

① TOP ASSY JI ECONOMY Ⅱ USA (JI−00003) (D−1/2)

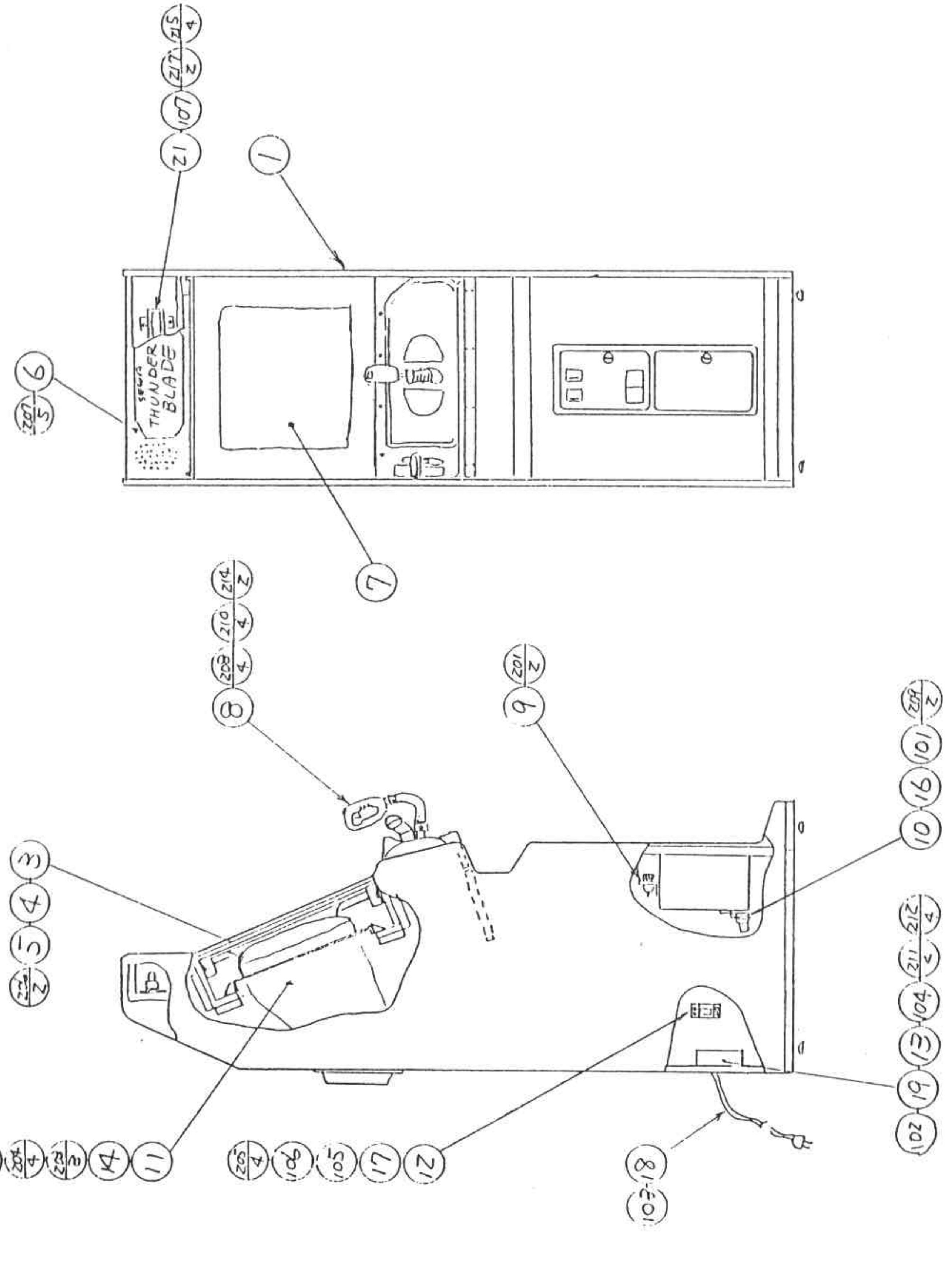




① TOP ASSY JI ECONOMY Ⅱ USA (JI−00003) (D−2/2)

ITEM NO.	PART NO.	DESCRIPTION
1	JI−10003	ASSY CABINET ECONOMY U/R Ⅱ USA
2	JI−40003	ASSY PWR SPLY ECONOMY U/R Ⅱ EXPORT
3	JI−0027	ASSY GAME BD & SHIELD CASE ECON U/R Ⅱ
4	TX−0028	SHIELD PLATE
5	420−5876−01	OWNERS MANUAL JI ECONOMY U/R Ⅱ ENG
6	421−5800−70	ORIGINAL SEAL THUNDER BLADE
7	421−6120	STICKER SEGA USA
8	421−6119−91	STICKER FCC
9	421−6709	STICKER SERVICE INSTR ENGLISH
10	421−6671	STICKER DANGER HIGH VOLTAGE
11	421−7129−03	ADJUST INSTR SHEET THUNDER BLADE
12	420−5318	DISPLAY MANUAL 20″
13	117−5123	NAME PLATE ELEC SPEC USA
14	SGB−1035X	KEY BAG
15	SGM−2675	POLYETHYLENE BAG 240×370
16	SGM−1964	POLYETHYLENE COVER 650×1500×850
17	421−6594	STICKER SERIAL NO. INFO
	TX−1317	EXT. SPRING
	TX−1330	EXT. SPRING
	TX−1423	EXT. SPRING
	220−5130	VOL CONT B−5K OHM
	540−0006−01	WRENCH FOR TMP SCR DUAL TYPE M4
	540−0007−01	WRENCH FOR TMP SCR DUAL TYPE M5
	540−0015−01	WRENCH FOR TMP SCR DUAL TYPE M6
18	421−6186−1	DENOMINATION SHEET 1 GAME 2×25¢
19	421−6186−2	DENOMINATION SHEET 1 GAME 25¢
20	421−6186−46	DENOMINATION SHEET 1 GAME 3×25¢
101	280−5079	NYLACH GROMMET
102	280−5080	NYLACH PLUNGER
201	000−0416−FS	M SCR PH W/FS M4×16
202	000−0530	M SCR PH M5×30
203	061−0005	SPR WSHR M5
204	069−0001	FLT WSHR 5.5−20×1.6
205	046−0001	SCR NAIL THH STNLS 1.5×16

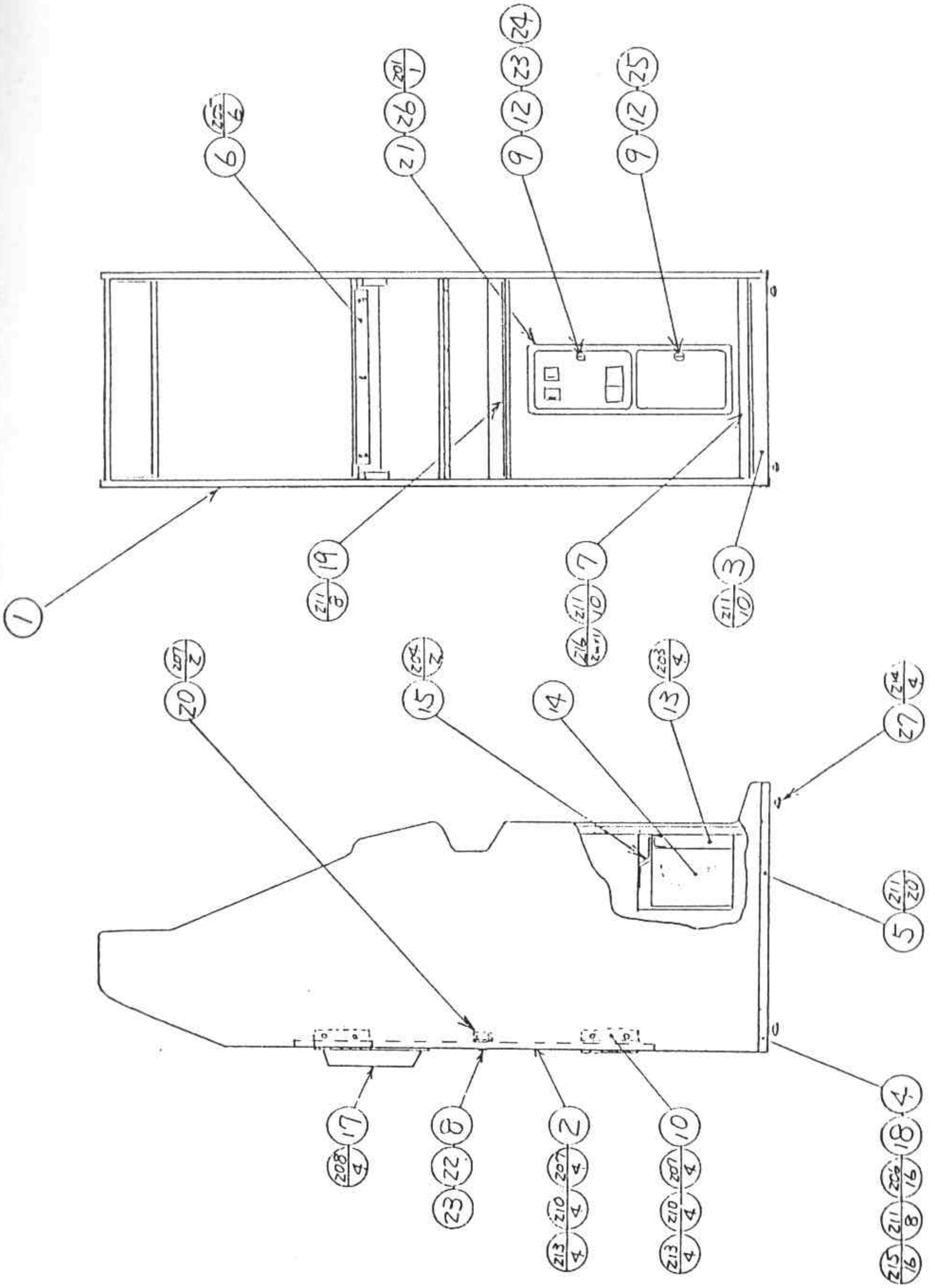
② ASSY CABINET ECONOMY U/R Ⅱ USA (JI−10003) (D−1/2)



② ASSY CABINET ECONOMY U/R Ⅱ USA (JI−10003) (D−2/2)

ITEM NO.	PART NO.	DESCRIPTION
1	JI−17001	ASSY SUB−CABINET ECONOMY U/R Ⅱ USR
3	JI−1705	MASK BOARD
4	AB−1166Z	TV MASK 20
5	AB−1151Y	TV MASK GRAY SMOKE
6	JI−1706	ASSY BILLBOARD & SP
7	JI−1702	FRONT GLASS
8	JI−20002	ASSY CONTROL PANEL ECONOMY U/R Ⅱ
9	TX−1624	SW UNIT MINI U/R EXPORT
10	RA−1016	METER BRACKET
11	TY−1019	BRACKET TV
12	105−0064	BRKT MAIN SW
13	105−5044	COVER
14	200−5095	ASSY CLR DSPL 20 TYPE
16	421−6591−01	STICKER COIN METER
17	421−6672	STICKER MAIN SW PUSH ON PUSH OFF
18	600−0110	CABLE & PLUG ASSY W/EARTH
19	253−5092	CAP SW
21	VE−1036	FL BRACKET
22	600−5603	WIRE HARN EXT 10P
23	600−5649	WIRE HARN EXT JST 20P
24	600−5651	WIRE HARN EXT JST 12P
25	600−5650	WIRE HARN EXT JST 25P
101	220−5064	MAG CNTR 6DIG DC5V
102	280−0417	TERMINAL BINDING POST BLK
103	280−0418	BUSHING STRAIN RELIEF 8.3
104	280−0425	CORD CLAMP ∅10
105	509−0039	SW PB TYPE
106	509−0049	SW STOPPER ∅12
107	390−5099	ASSY FL LIGHT 10W
108	280−5009	CORD CLAMP ∅21
109	280−0419	HARNESS LUG
110	280−5008	CORD CLAMP ∅15
201	000−0410−S	M SCR PH W/S M4×10
203	000−0510−S	M SCR PH W/S M5×10
204	000−0520−S	M SCR PH W/S M5×20
205	005−3113−F	W SCR RH W/F 3.1×13
206	006−3110	W SCR FH 3.1×10
207	008−0416	TMP PRF SCR TH M4×16
208	008−0516	TMP PRF SCR TH M5×16
209	010−0408−F	S−TITE SCR W/F M4×8
210	029−0079	TMP PRF SCR TH M6×35
211	031−0425−B	CRE BLT BLK M4×25
212	051−0004	FLG NUT M4
213	069−0001	FLT WSHR 5.5−20×16
214	000−0520−FS	M SCR PH W/FS M5×20
215	005−3513−F	W SCR RH W/F 3.5×13
217	010−0406−F	S−TITE SCR W/F M4×6

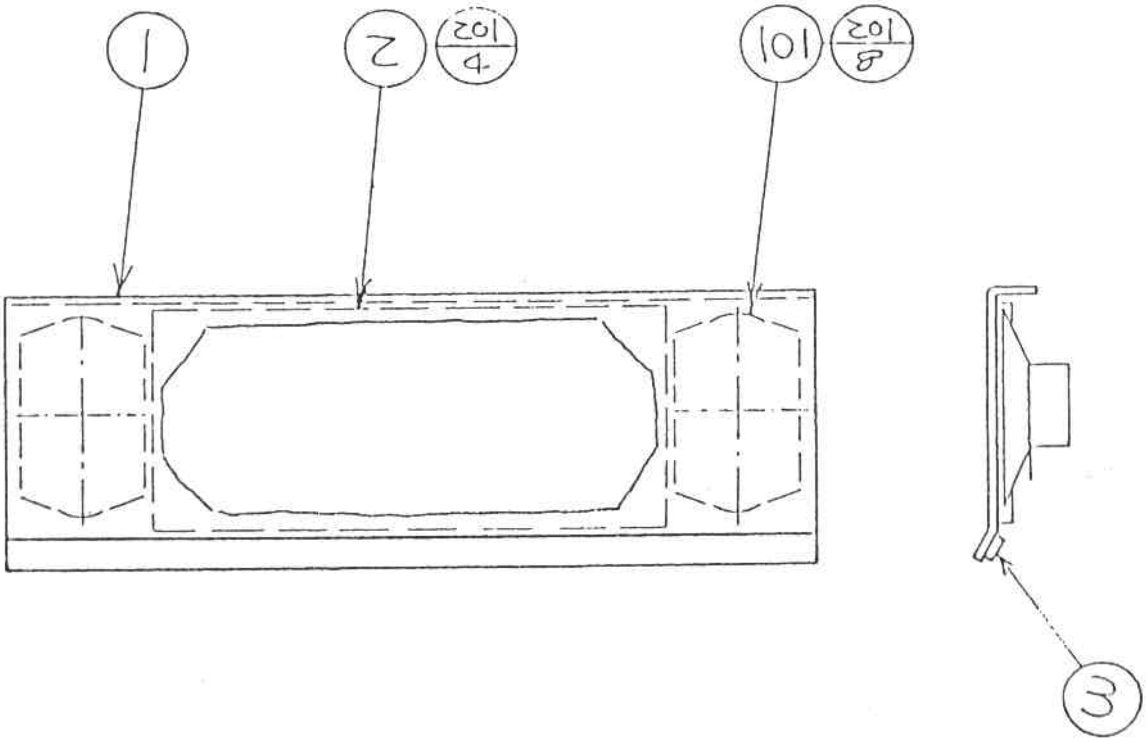
③ ASSY SUB-CABINET ECONOMY U/R Ⅱ USA (JI-17001) (D-1/2)



③ ASSY SUB-CABINET ECONOMY U/R Ⅱ USA (JI-17001) (D-2/2)

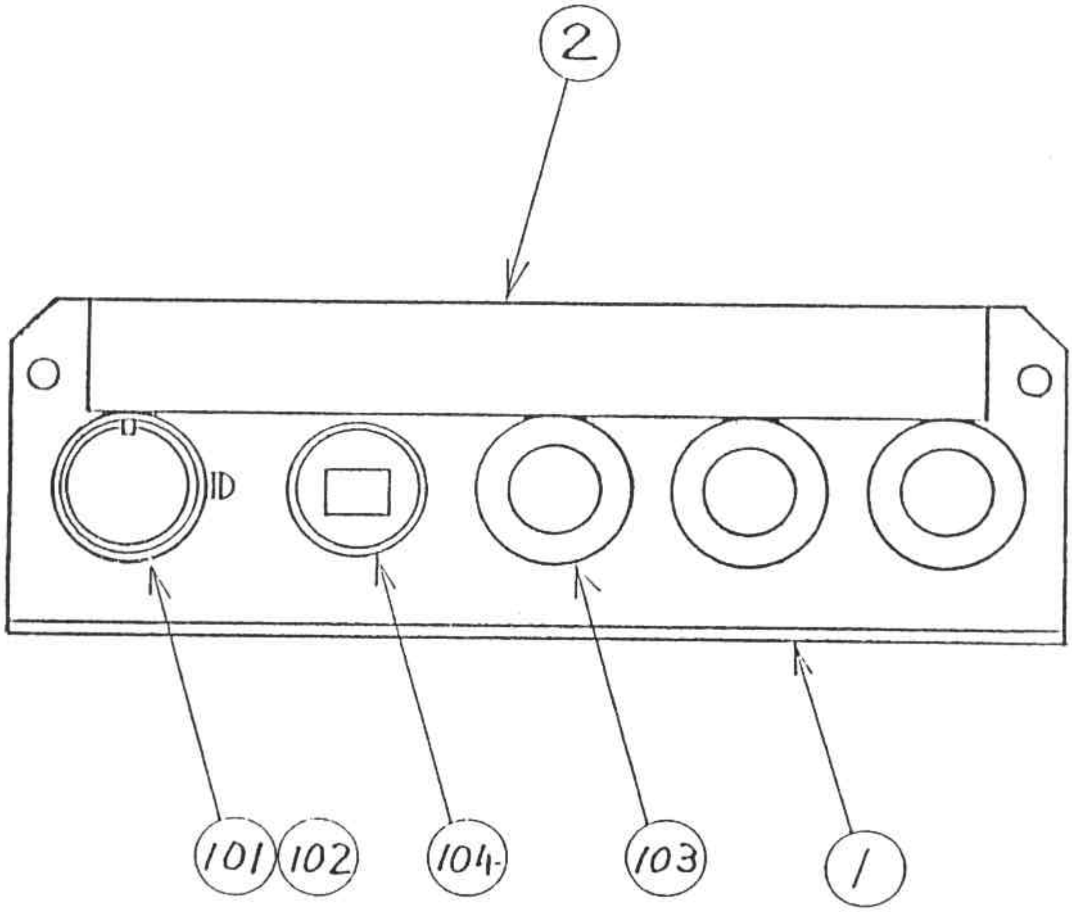
ITEM NO.	PART NO.	DESCRIPTION
1	JI-1701	WOODEN CABINET ECONOMY U/R EXPORT
2	TX-1702	BACK DOOR
3	TX-1703	SUPPORT BRACKET
4	TX-1704	PROTECTOR A
5	TX-1705	PROTECTOR B
6	TX-1706	BRACKET HOLDER
7	TX-1710	FLOOR MAT
8	DP-1148X	LKG TNG
9	DP-1167	TNG LKG
10	HG-1622	HINGE 148
12	HN-1050	SPACER RING
13	KR-1606Y	COVER CASH BOX
14	KR-1607X	CASH BOX
15	KR-1608	LOCK BRACKET
17	MO-1053	COVER
18	TI-1079	LEG ADJUSTER BRACKET
19	TX-1717	FRONT PROTECTOR
20	105-5038	STOPPER
21	109-0045	KEY HOLDER
22	117-0062	PLATE LOCK RETAINER
23	220-5044-01	MAGNETIC LOCK MASTER W/O KEY
24	220-5045-01	KEY MASTER FOR 220-5044-01
25	220-5046	MAGNETIC LOCK W/KEYS
26	220-5128-03	ASSY COIN CHUTE 2DOOR USA 25ø×2 TWIN
27	601-0455	LEG ADJUSTER
201	000-0306-F	M SCR PH W/F M3×6
203	000-0406-S	M SCR PH W/S M4×6
204	000-0408-S	M SCR PH W/S M4×8
205	000-0520-S	M SCR PH W/S M5×20
206	000-0525	M SCR PH M5×25
207	005-3516-F	W SCR RH W/F 3.5×16
208	008-0420	TMP PRF SCR TH M4×20
210	031-0525-B	CRG BLT BLK M5×25
211	046-0001	SCR NAIL THH STNLS 1.5×16
213	051-0005	FLG NUT M5
214	059-0007	HEX NUT 3/8-16
215	061-0005	SPR WSHR M5
216	090-0007	DOUBLE FACE TAPE 20mm×50m/ROLL

④ ASSY BILLBOARD & SP (JI−1706)



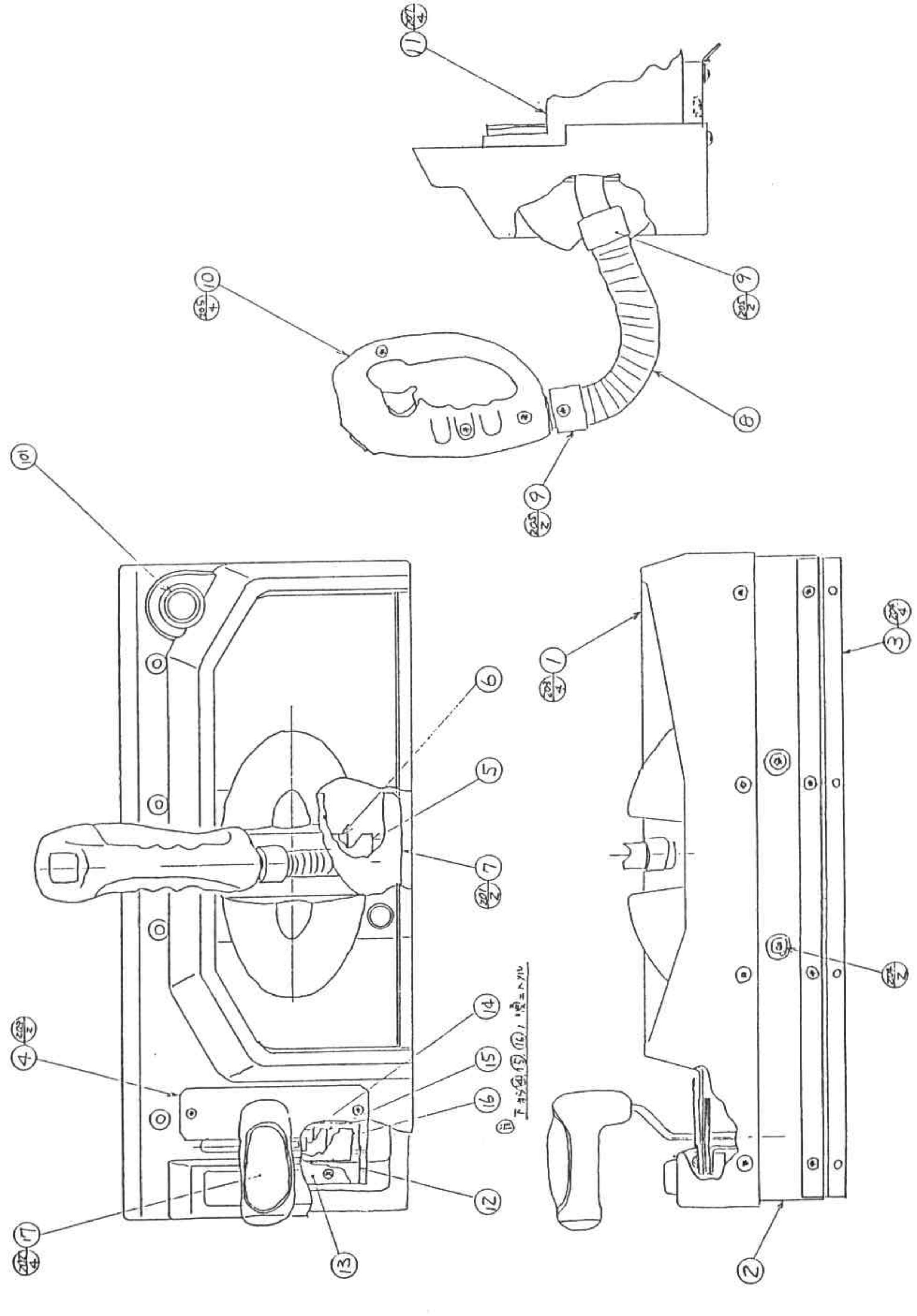
ITEM NO.	PART NO.	DESCRIPTION
1	TX−1715	BILLBOARD & SP BASE
2	423−0085	DESIGN PLATE THUNDER BLADE MINI U/R
3	280−5106	CUSHION TAPE
101	130−5025	SPEAKER 12×8 8OHM 10W
201	051−0004	FLG NUT M4

⑤ SW UNIT MINI U/R EXPORT (TX-1624)



ITEM NO.	PART NO.	DESCRIPTION
1	KR-1721	SW BRKT
2	421-6550	STICKER SW
101	AH-1014	KNOB
	601-0042	KNOB 22mm
102	220-5179	VOL CONT B-5K OHM
103	509-5028	SW PB IM
104	512-5006	CIRCUIT PROTECTOR NRF 110-2A

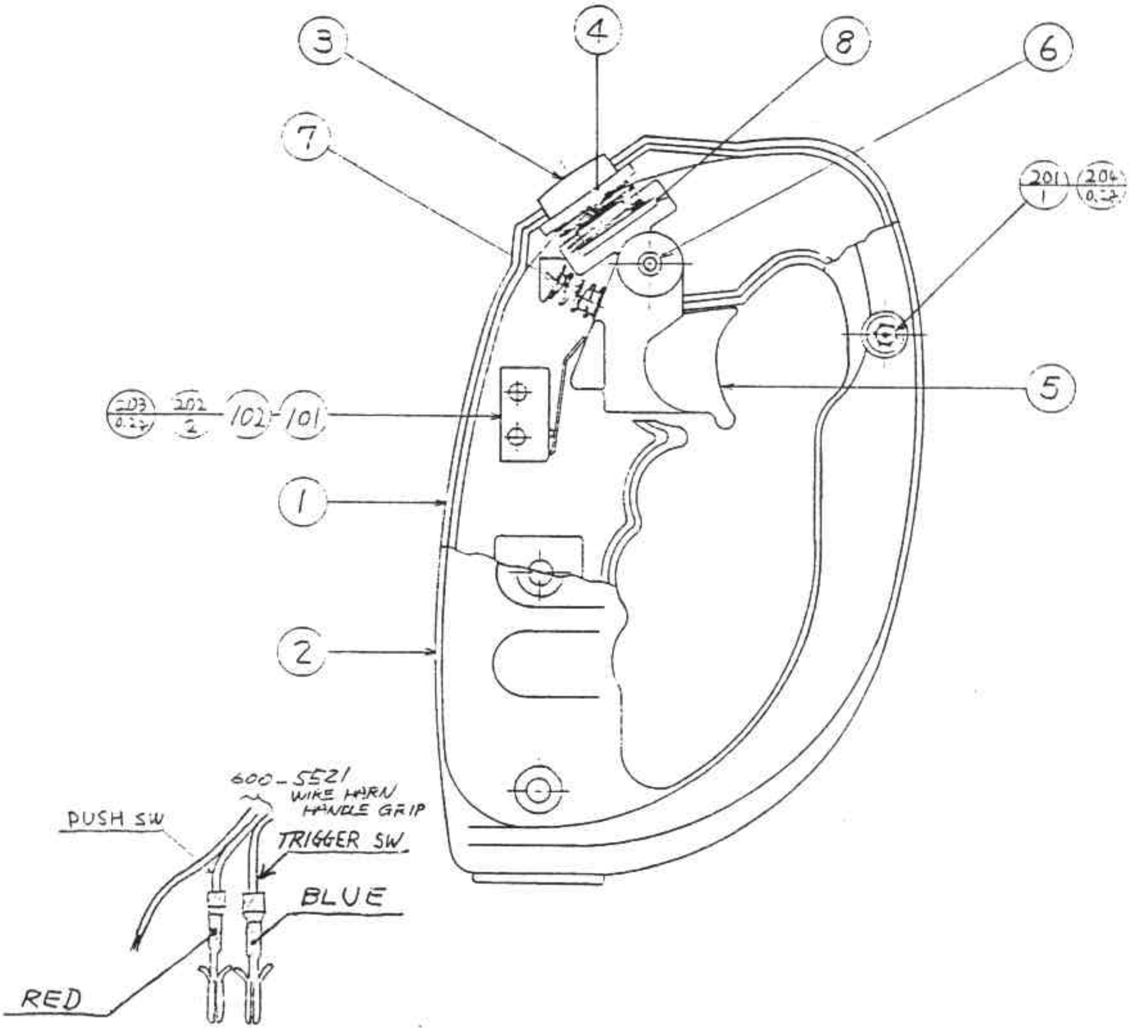
⑥ ASSY CONTROL PANEL ECONOMY U/R Ⅱ (JI−20002) (D−1/2)



⑥ ASSY CONTROL PANEL ECONOMY U/R Ⅱ (JI−20002) (D−2/2)

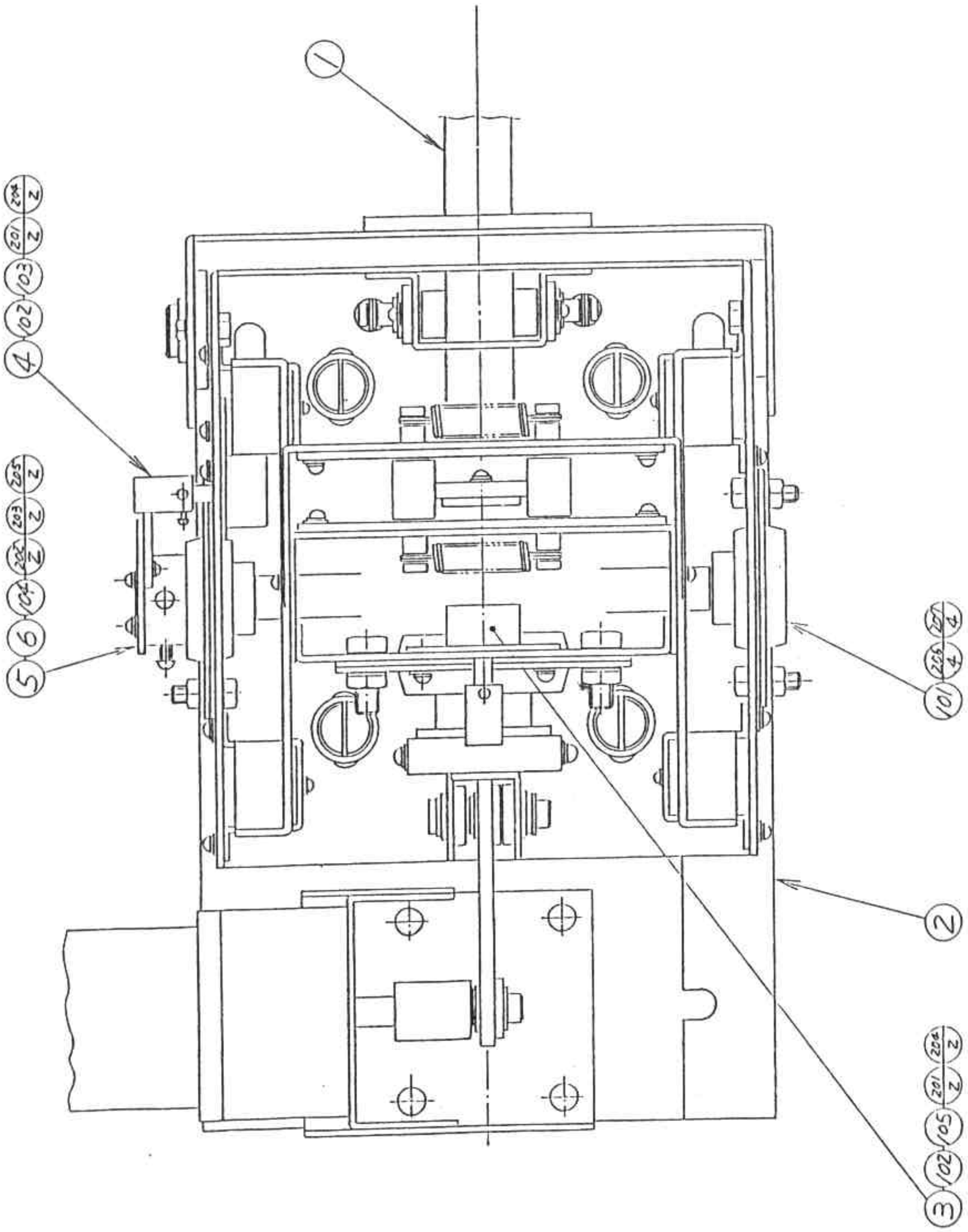
ITEM NO.	PART NO.	DESCRIPTION
1	TX−1376	CONTROL PANEL COVER
2	TX−1377	CONTROL PANEL BASE
3	TX−1378	HINGE 508
4	TX−1379	THROTTLE COVER PLATE
5	TX−1346	SLIDE PLATE A
6	TX−1347	SLIDE PLATE B
7	TX−1387	GUIDE PLATE
8	TX−1309	PROTECT TUBE
9	TX−1310	HOLDER A
10	TX−1335	ASSY HANDLE GRIP
11	JI−2132	ASSY CONTROLLER ECONOMY U/R Ⅱ
12	TX−1435	GUIDE COVER A
13	TX−1436	GUIDE COVER B
14	TX−1437	SLIDE COVER A
15	TX−1438	SLIDE COVER B
16	TX−1439	SLIDE COVER C
17	JI−3203	ASSY THROTTLE ECONOMY U/R Ⅱ
101	509−5050	PUSH BUTTON SWITCH IT YELLOW W/LAMP
102	280−0425	CORD CLAMP ∅10
103	280−5008	CORD CLAMP ∅15
104	280−0419	HARNESS LUG
201	000−0416−FS	M SCR PH W/FS M4×16
202	000−0525−FS	M SCR PH W/FS M5×25
203	008−0416	TMP PRF SCR TH M4×16
204	008−0516	TMP PRF SCR TH M5×16
205	029−0052	TMP PRF SCR PH M5×10
206	005−3113−F	W SCR RH W/F 3.1×13
207	000−0516−FS	M SCR PH W/FS M5×16

⑦ ASSY HANDLE GRIP (TX−1335)



ITEM NO.	PART NO.	DESCRIPTION
1	TX−1336	HANDLE GRIP LEFT
2	TX−1337	HANDLE GRIP RIGHT
3	TX−1338	BUTTON
4	TX−1339	COMPRESSION SPRING
5	CD−2041	TRIGGER
6	CD−2042	SHAFT TRIGGER
7	125−0011	COMPRESSION SPRING
8	839−0087	SW BOARD
9	600−5521	WIRE HARN HANDLE GRIP
10	211−0041	CONN PIN AMP
101	509−0058	SWITCH MICRO TYPE
102	530−0028	THERMO−SHRINK TUBE HISHIUTE TRANSPARENT 4mm
201	029−0052	TMP PRF SCR PH M5×10
202	029−0134	M SCR PH M2×10
203	244−044	GLUE SCR LOCK
204	244−106	LOCTITE #271

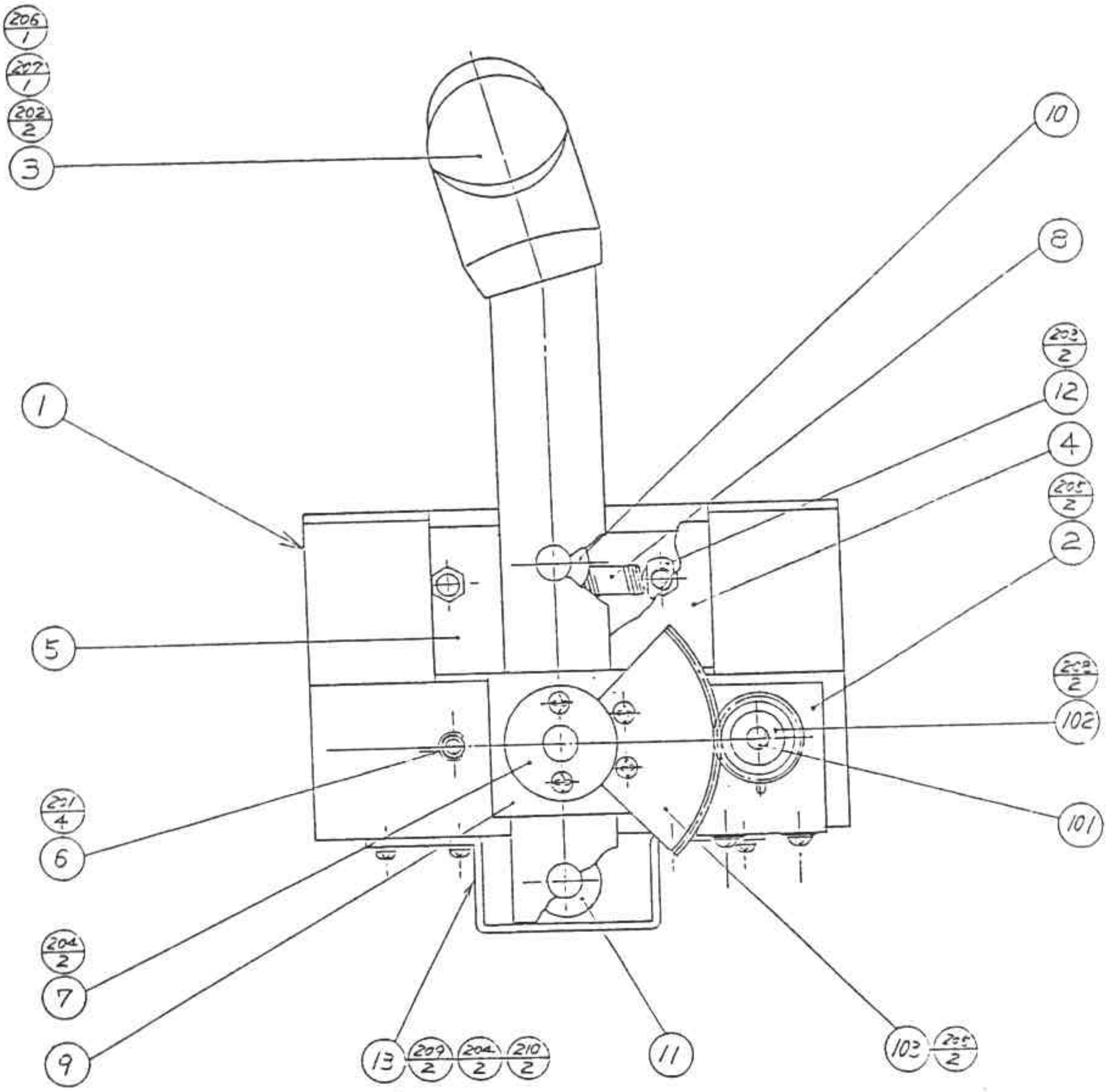
⑧ ASSY CONTROLLER ECONOMY U/R Ⅱ (JI−2132) (D−1/2)



⑧ ASSY CONTROLLER ECONOMY U/R Ⅱ (JI−2132) (D−2/2)

ITEM NO.	PART NO.	DESCRIPTION
1	TX−1385	SUB ASSY CONTROLLER MINI U/R
2	TX−1386	ASSY SHOCK MECHANISM MINI U/R
3	TX−1318	VR BRACKET A
4	TX−1334	VR BRACKET B
5	TX−1307	ADJUST PLATE
6	MX−2017	ADJUSTER
101	100−5042	BEARING ∅12
102	220−5130	VOL CONT B−5K OHM
103	601−5410	GEAR 15, ∅6
104	601−5423	GEAR 1/6
105	601−5943	GEAR 20, ∅15
201	000−0408−FS	M SCR PH W/FS M4×8
202	000−0408−S	M SCR PH W/S M4×8
203	000−0412−FS	M SCR PH W/FS M4×12
204	028−0003	SET SCR PH SPECIAL M3×8
205	028−0021	SET SCR PH SPECIAL M4×16
206	061−0006	SPR WSHR M6
207	054−0006	U NUT M6

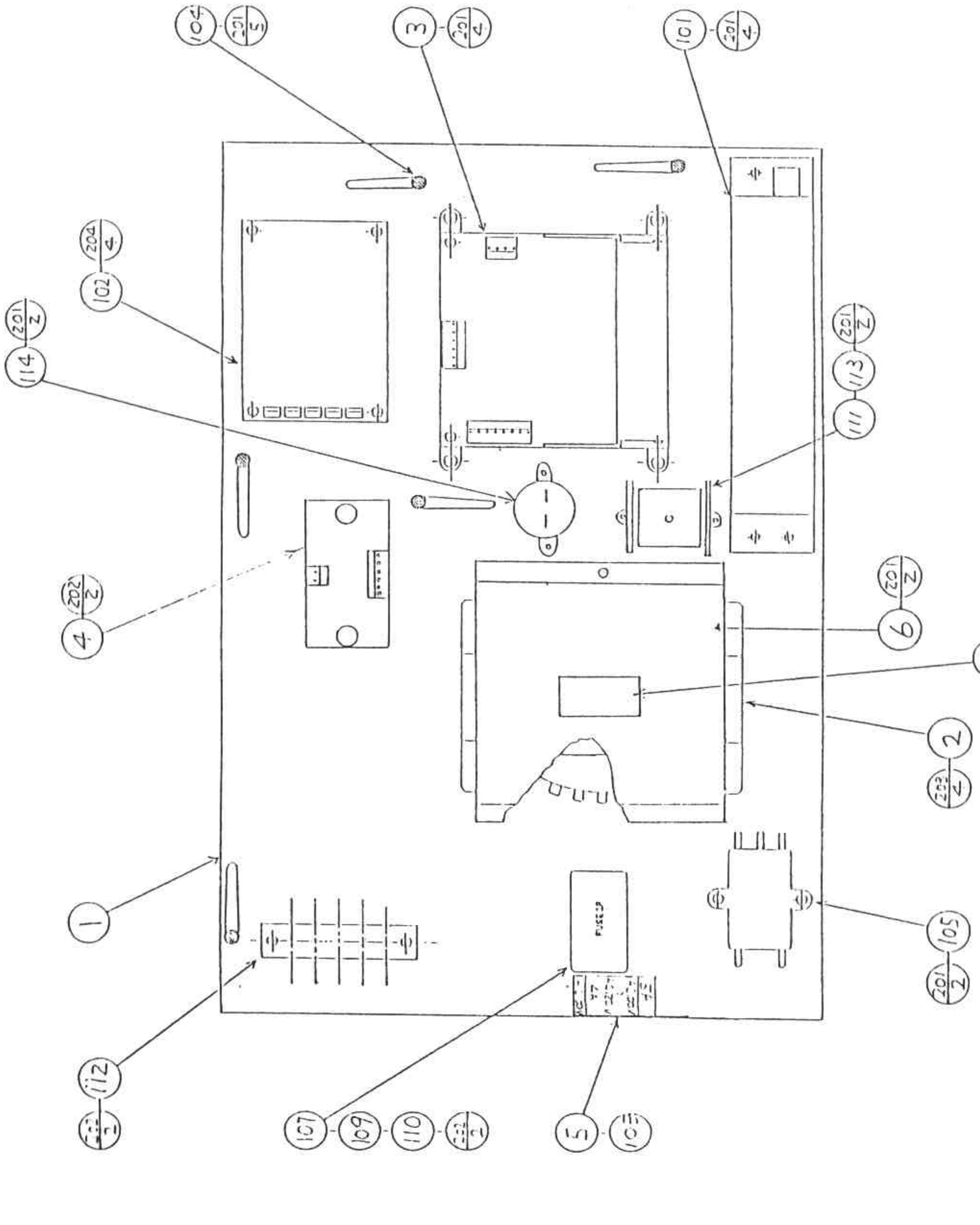
⑨ ASSY THROTTLE ECONOMY U/R Ⅱ (JI−3203) (D−1/2)



⑨ ASSY THROTTLE ECONOMY U/R Ⅱ (JI−3203) (D−2/2)

ITEM NO.	PART NO.	DESCRIPTION
1	TX−1418	THROTTLE BASE
2	TX−1419	VR BRACKET
3	TX−1432	THROTTLE LEVER U/R
4	TX−1403	SWING ARM A
5	TX−1404	SWING ARM B
6	TX−1405	SHAFT SWING ARM
7	TX−1406	GUIDE RING
8	TX−1423	EXT SPRING
9	TX−1003	ADJUST PLATE
10	CY−2307	ROLLER
11	KR−1303	STOPPER PLATE
12	TX−1422	STUD
13	TX−1430	STOPPER BRACKET U/R
101	220−5130	VOL CONT B−5K OHM
102	601−5424	GEAR 30
103	601−5863	GEAR 1/4
201	065−0004	E RING 4mm
202	065−0008	E RING 8mm
203	054−0006	U−NUT M6
204	000−0414−S	M SCR PH W/S M4×14
205	000−0408−FS	M SCR PH W/FS M4×8
206	060−0010	FLT WSHR M10
207	045−0022	COT PIN 2.5×20
208	028−0014	SET SCR HEX SKT CP UNBR M4×4
	244−117	GREASE
	244−116	SCREW LOCK
209	000−0406−S	M SCR PH W/S M4×6
210	054−0004	U−NUT M4

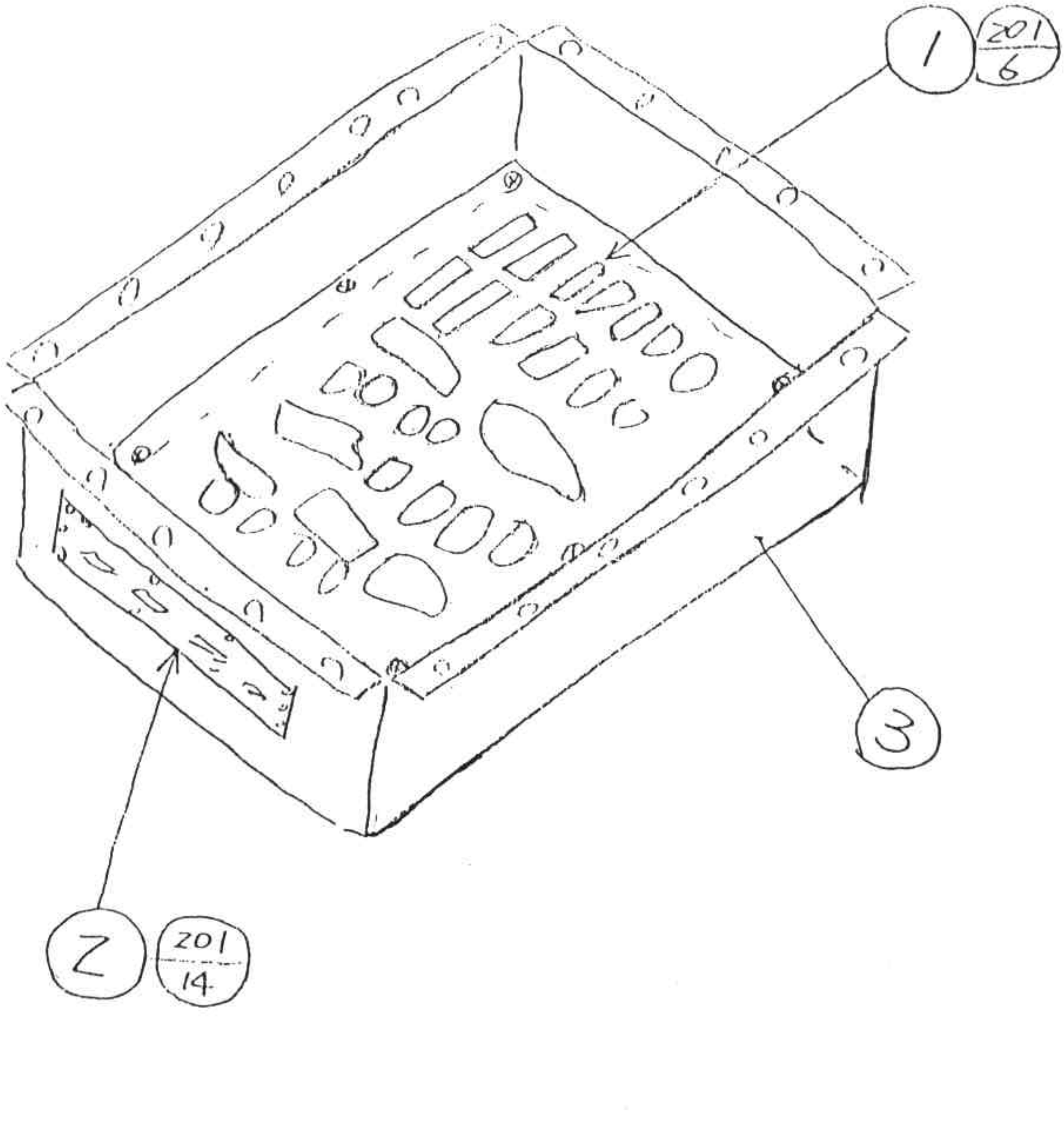
⑩ ASSY PWR SPLY ECONOMY U/R Ⅱ EXPORT (JI−40003) (D−1/2)



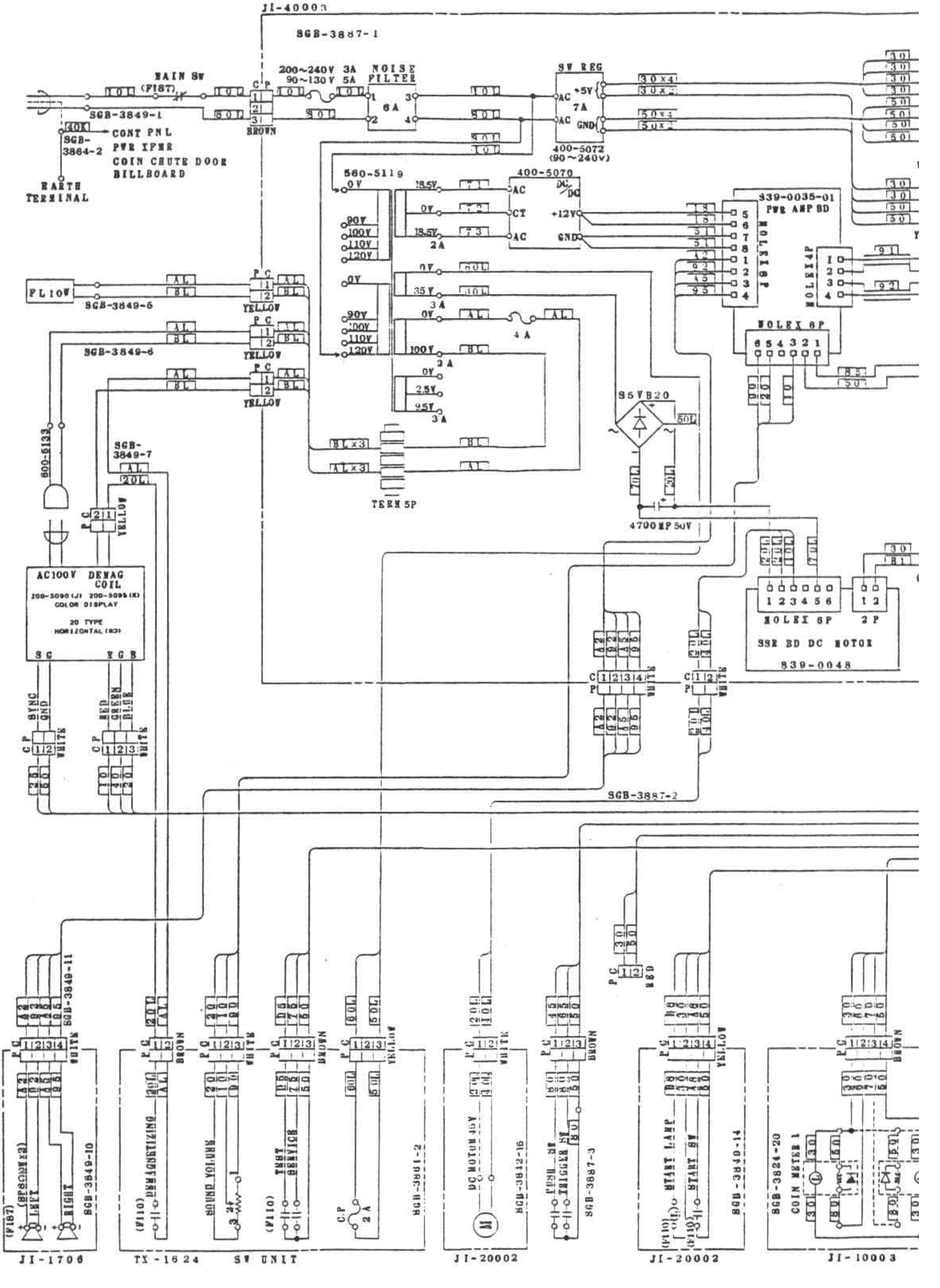
⑩ ASSY PWR SPLY ECONOMY U/R Ⅱ EXPORT (JI−40003) (D−2/2)

ITEM NO.	PART NO.	DESCRIPTION
1	TX−4010	BASE
2	560−5119	PWR XFMR 90～240V 9.5V, 18.5V, 35V, 100V
3	839−0035−01	PWR AMP DC 12V 10W
4	839−0048	SSR BD DC MOTOR
5	421−6688	STICKER FUSE INSTR (200V−240V AREA)
	421−6687	STICKER FUSE INSTR (90V−130V AREA)
6	RA−4002	COVER
7	421−6690−01	STICKER 120V
	421−6690−02	STICKER 200V
	421−6690−03	STICKER 220V
	421−6690−04	STICKER 230V
	421−6690−05	STICKER 240V
8	421−6710	TAG 240V WIRE
101	400−5072	SW REGU AC90～240V +5V 7A
102	400−5070	DC/DC CONVER TER 12V 5A
103	601−0769	STAPLE MAX #3
104	280−0419	HARNESS LUG
105	270−5020	NOISE FILTER AC 250V 6A
107	514−0064	FUSE HOLDER 2P W/COVER
109	514−0036	FUSE 3A 6.4×30mm (200V−240V AREA)
	514−0034	FUSE 5A 6.4×30mm (90V−130V AREA)
110	514−0040	FUSE 4A 6.4×30mm
111	117−0184	TERMINAL PLATE 1L 4P
112	117−5131	TERMINAL PLATE 5P
113	481−0157	DIODE BRIDGE S5VB 20
114	150−0173	CAP E 4700 MF 50V C−TYPE
201	005−3113	W SCR RH 3.1×13
202	005−3120	W SCR RH 3.1×20
203	000−0416−FS	M SCR PH W/FS M4×16
204	005−3125	W SCR RH 3.1×25
301	SGB−3887−1	WIRE HARN PWR SPLY
	212−5076	CONN FEM 4P
	212−5034	CONN FEM 6P
	212−5067	CONN FEM 8P
	211−0117	CONN CAP AMP 2P YELLOW
	212−5033	CONN FEM 2P
	211−0095	CONN PLUG AMP 2P ORANGE
	211−0085	CONN PLUG AMP 2P BROWN
	211−0044	CONN CAP AMP 2P WHITE
	211−0060	CONN CAP AMP 3P WHITE
	211−0120	CONN CAP AMP 3P YELLOW
	211−0072	CONN CAP AMP 4P WHITE
	211−0123	CONN CAP AMP 4P YELLOW
	211−0065	CONN CAP AMP 9P WHITE
	211−0086	CONN PLUG AMP 3P BROWN
	211−0087	CONN PLUG AMP 4P BROWN
	211−0005	CONN CRINP
	211−0041	CONN PIN AMP
	211−0042	CONN SOCKET AMP
	211−0167	TERMINAL LUG RND ID5
	280−0472	FASTON RCPT 110
	280−5015	FASTON RCPT 187

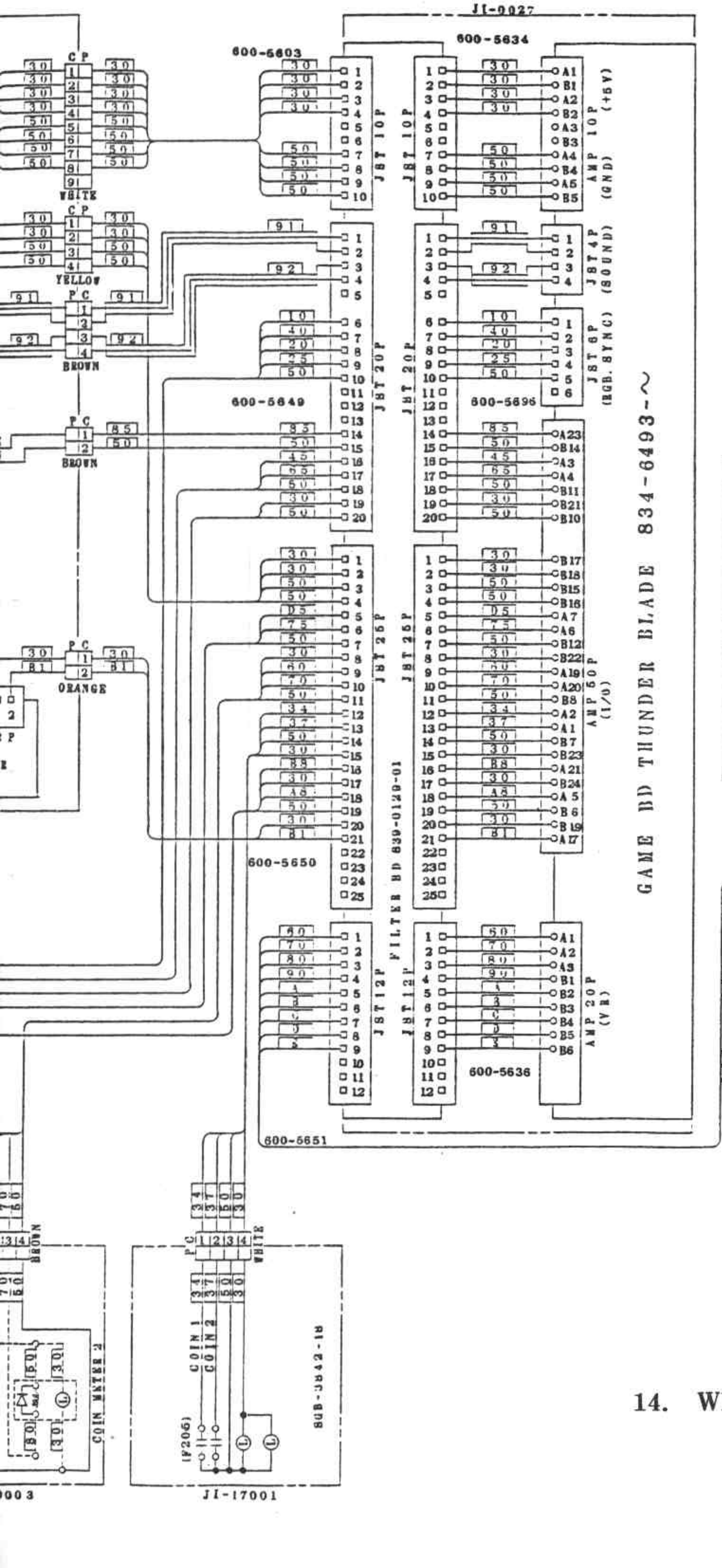
⑪ ASSY GAME BD & SHIELD CASE ECON U/R Ⅱ (JI−0027)

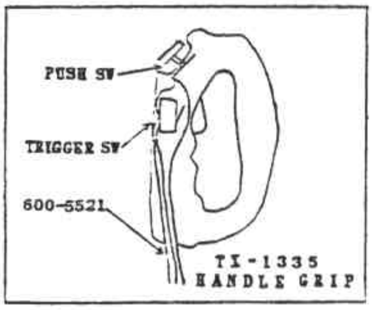


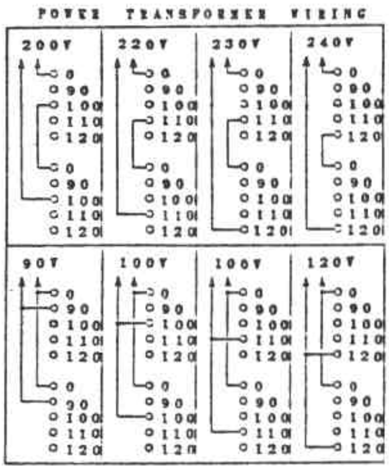
ITEM NO.	PART NO.	DESCRIPTION
1	834−6493−03	GAME BD THUNDER BLADE
2	839−0129−01	FILTER BD THUNDER BLADE ECONOMY U/R
3	TX−0027	SHIELD CASE
4	600−5634	WIRE HARN AMP 10P & JST 10P
5	600−5636	WIRE HARN AMP 20P & JST 12P
6	600−5696	WIRE HARN AMP 50P & JST×4
201	010−0310−F	S−TITE SCR PH W/F M3×10

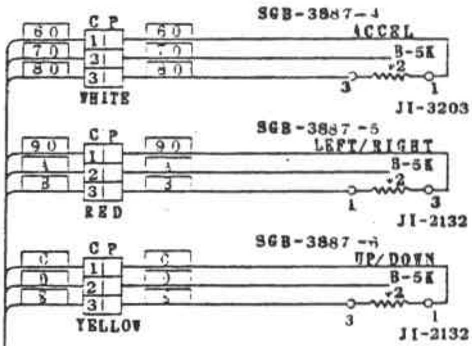


JI-40003
SGB-3887-1
MAIN SW
(F187)
200~240V 3A
90~130V 5A
NOISE FILTER
6A
SW REG
+5V
7A
GND
400-5072
(90~240V)
SGB-3849-1
CONT PNL
PWR XFMR
COIN CHUTE DOOR
BILLBOARD
SGB-3864-2
EARTH TERMINAL
BROWN
560-5119
400-5070
DC/DC
+12V
GND
339-0035-01
PWR AMP BD
MOLEX 8P
MOLEX 4P
MOLEX 6P
FL10W
SGB-3849-5
YELLOW
SGB-3849-6
4A
2A
3A
S5VB20
4700MF 50V
TERM 5P
SGB-3849-7
600-5133
AC100V DEMAG COIL
200-5090 (J) 200-5095 (E)
COLOR DISPLAY
20 TYPE
HORIZONTAL (SD)
SYNC
GND
RED
GREEN
BLUE
WHITE
MOLEX 6P
2P
SSR BD DC MOTOR
839-0048
SGB-3887-2
SGB-3849-11
SPEAKER
LEFT
RIGHT
SGB-3849-10
JI-1706
DEMAGNETIZING
TX-1624
SOUND VOLUME
TEST
SERVICE
SW UNIT
SGB-3881-2
DC MOTOR 45V
SGB-3812-15
JI-20002
PUSH SW
TRIGGER SW
SGB-3887-3
RED
START LAMP
START SW
SGB-3840-14
JI-20002
SGB-3824-20
COIN METER 1
JI-10003









14. WIRING DIAGRAM

420-5876 THUNDER BLADE OWNER'S MANUAL
(420-5876-01)

SUPPLEMENT

There are a number of differences between the owner's manual and the game which you have received.

1. The Printed Circuit Board is mounted on the side wall of the cabinet, rather than on the rear door, and is not enclosed in a metal cage.
2. There is no demagnetising switch as this facility is not required with Wells Gardner monitors.
3. The test switch is a slide type rather than a push-button type.
4. A Wells Gardner monitor is fitted and this is fully described in the monitor manual. This monitor operates on 120 volts rather than 100 volts.
5. The game is fitted with 2 x 2 amp 250 volt slow blow fuses. One protects the mains input and the other protects the motor.

April 11, 1988.

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